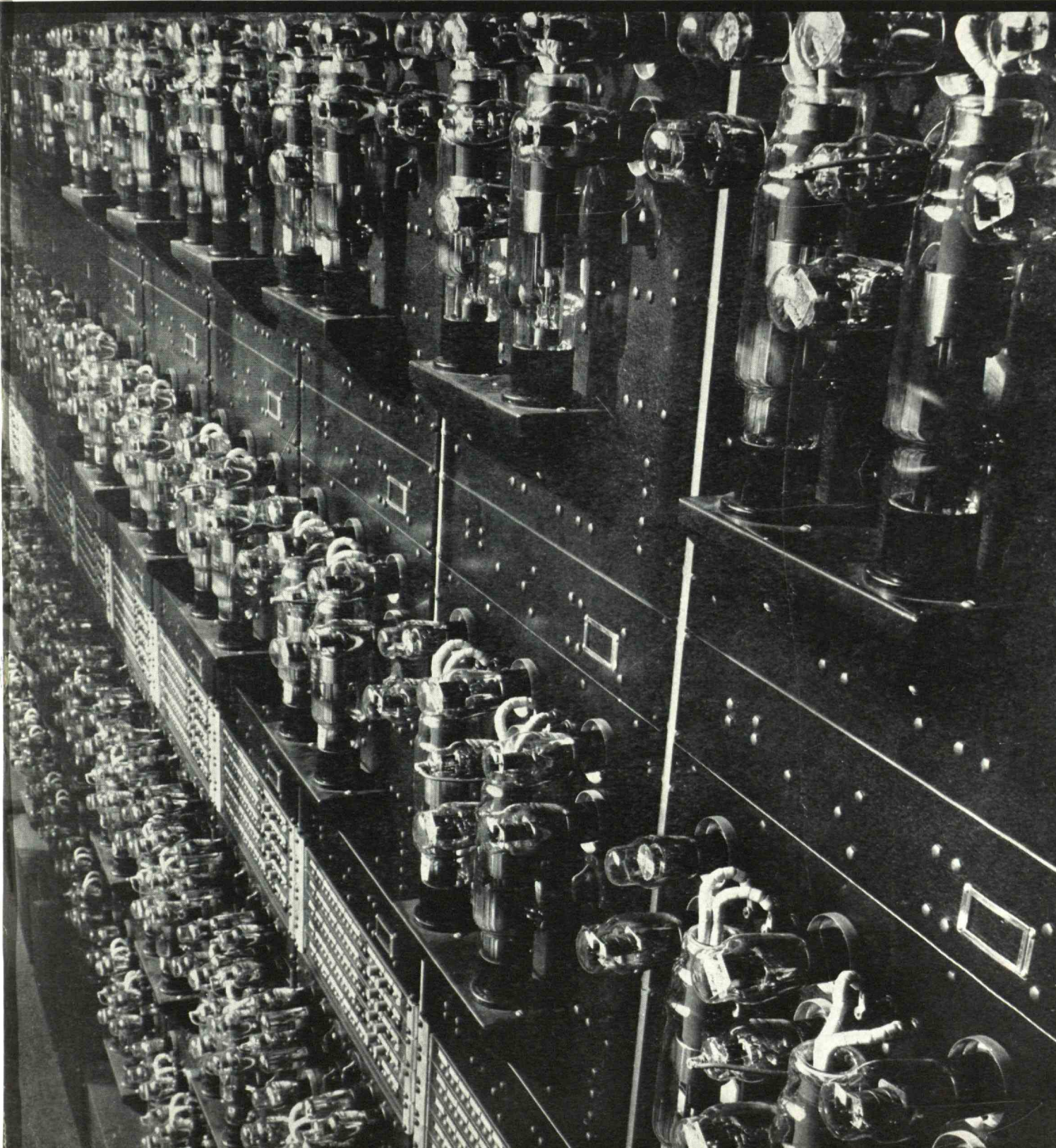


November 1945

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office

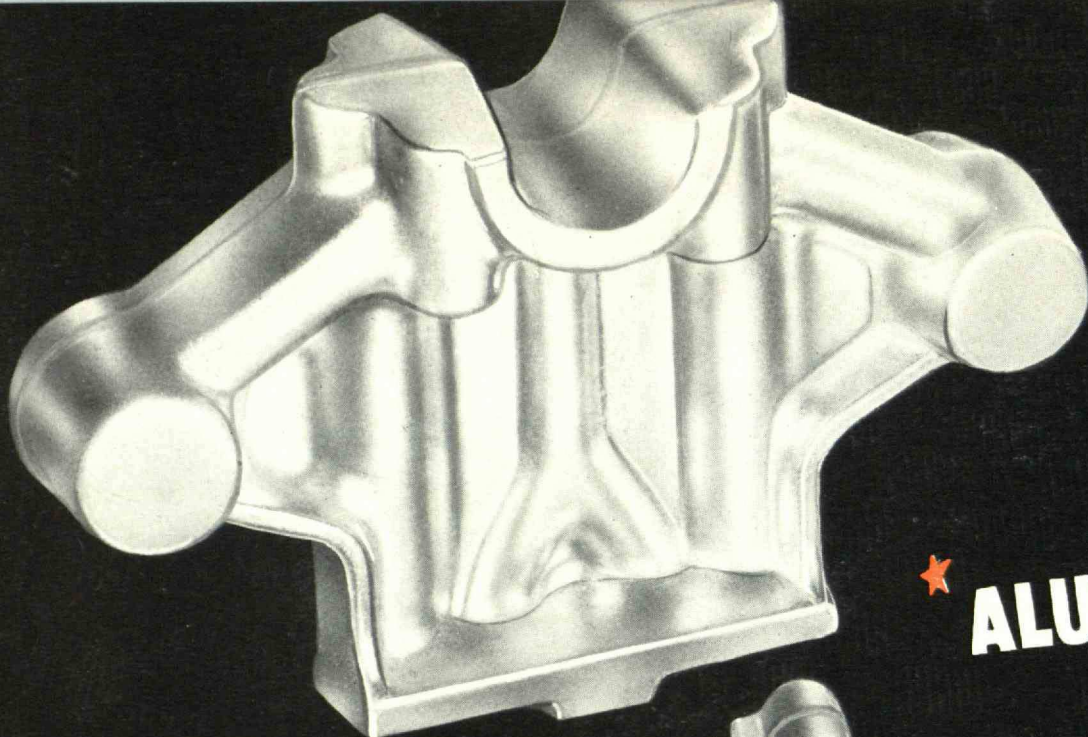


technology review

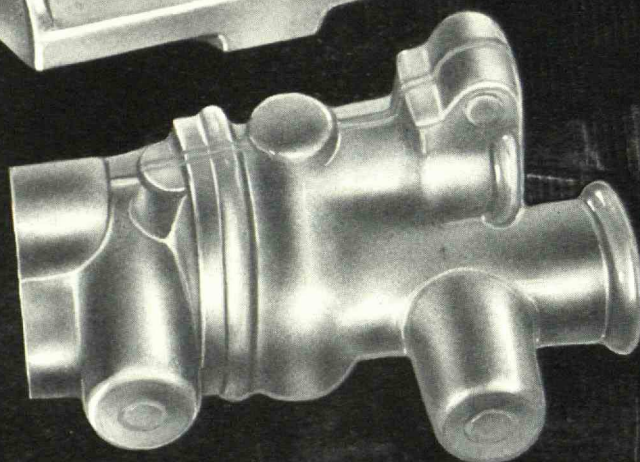
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**One of these men
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Every eye in your plant that lacks the protection of safety goggles is a potential target for a costly accident. For insurance company records show that for medical expenses and compensation the average eye accident cost amounts to \$343. Understand, *average* includes the so-called "minor" injuries as well as the big claim cases. And the total industrial eye accident cost is more than \$5 *per shop worker per year**.

AO Safety Goggles Provide Positive Protection

Why let these unnecessary excessive costs continue, when you can equip your workers with AO Safety Goggles for about \$1.50 a pair.

Your nearest AO Branch Office will be glad to help you work out a sound program for lower costs through safer methods.

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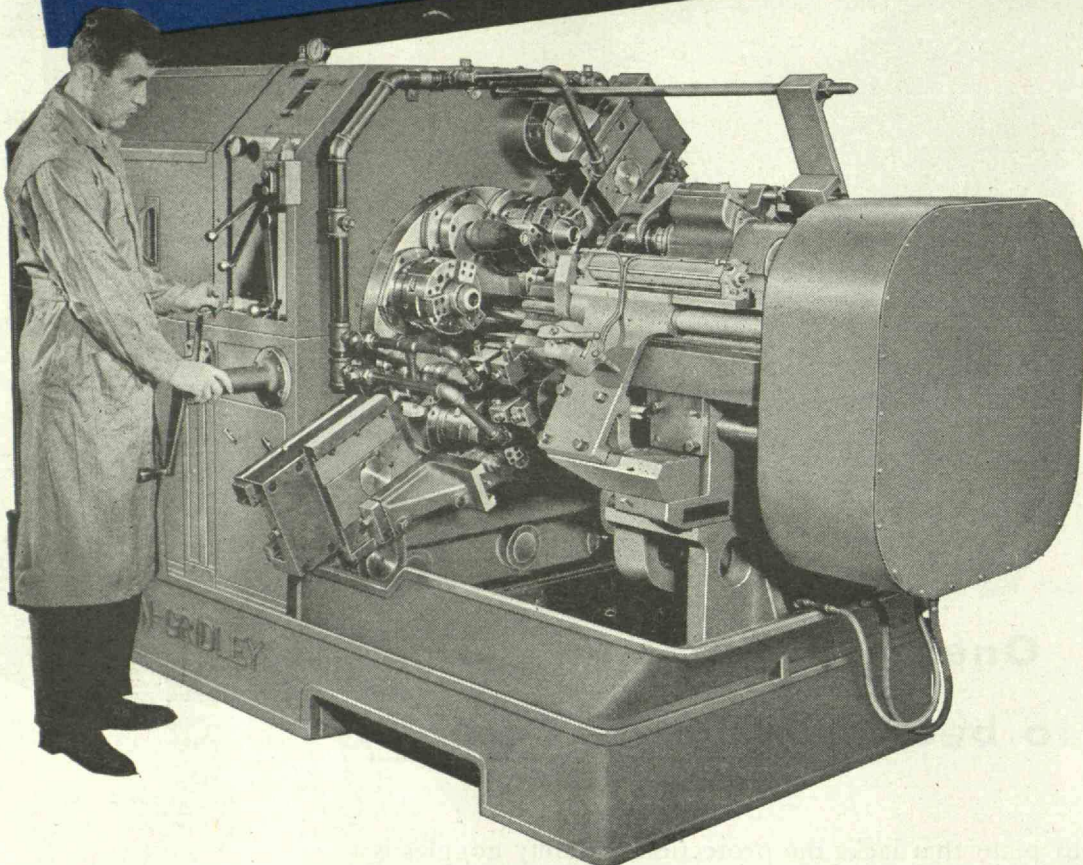
SOUTHBRIDGE, MASSACHUSETTS

*Estimated by the Society for the Prevention of Blindness

THE TECHNOLOGY REVIEW, November, 1945. Vol. XLVIII, No. 1. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription \$3.50; Canadian and Foreign subscription \$4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

LEADERSHIP

PROVED BY HUNDREDS OF CASE HISTORIES...



NEW BRITAINS DELIVER . . . AT WAR AND AT PEACE

The automatic chucking machine business had its inception in the heart of Connecticut in the year 1911. Basic designs and operational features met with immediate success, for here was new speed and production of efficiency.

New Britain chuckers built in 1911 were years ahead in functional design and application, and extensive research coupled with advance engineering has kept them way out in front . . . to cope with mass production methods and keen competition.

New Britains' ability to speed up production of essential

ammunition parts and equipment proved of great importance back in '18. During the era of industrial development that followed World War I, American initiative and ingenuity accounted for many refinements in design . . . to meet rigid specifications, quality and quantity production demands.

Today, the Army-Navy "E" award and three continuous performance stars are evidence of New Britain Machine's outstanding contributions to achieve a decisive Victory in World War II . . . a combination of the best in men, machines and materials to produce the ultimate in multiple spindle bar and chucking machines.

NEW BRITAIN AUTOMATICS

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT
NEW BRITAIN - GRIDLEY DIVISION

...Here's One

Extensive metallurgical research is resulting in new manufacturing economies while turning out higher quality parts and products. The motor end frame is one of several typical jobs employing an alloy in preference to cast iron.

The aluminum alloy part presented an extreme chucking problem due to its 6.741" diameter and fragile $\frac{1}{8}$ " section. The selection of New Britain 88's proved to be the solution. Twenty-two (22) well-placed tools in eight positions are required to completely machine the rough casting . . . a part every 11.8 seconds. The machines are running 574 R.P.M. and produce 305 motor end frames per hour.

FIRST POSITION

Load in two-jaw hydraulically operated chucks.

SECOND POSITION

Face end of skirt from cross arm — Core Drill .7775 diameter — Rough turn 6.738 diameter.
Face end of hub.

THIRD POSITION

Core drill $1\frac{1}{8}$ " diameter and $15/16$ " diameter.
Rough turn 1.330 diameter.

FOURTH POSITION

Single point bore .7775 and $1\frac{1}{8}$ " diameters.
Rough turn 1.433 diameter.

FIFTH POSITION

Single point bore .7775 and $1\frac{1}{8}$ " diameters and chamfer $1\frac{1}{8}$ " diameter. Semi-finish turn 6.738 diameter.

SIXTH POSITION

Finish face side of skirt from cross arm. Rough recess both grooves.

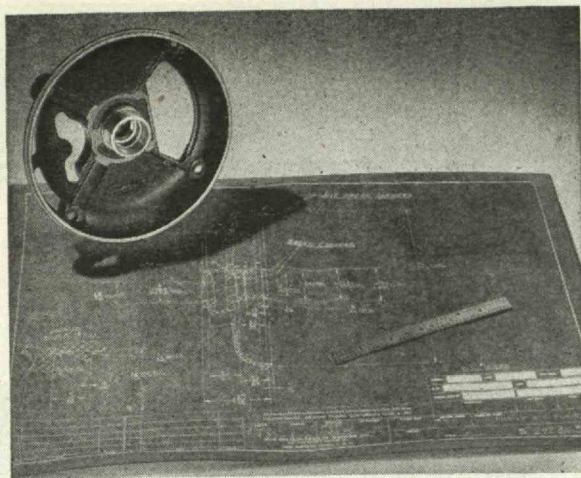
SEVENTH POSITION

Finish recess both grooves.

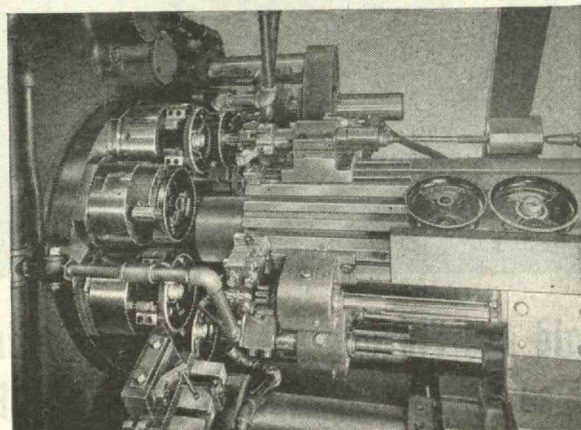
EIGHTH POSITION

Ream .7775 diameter — Finish turn and chamfer.

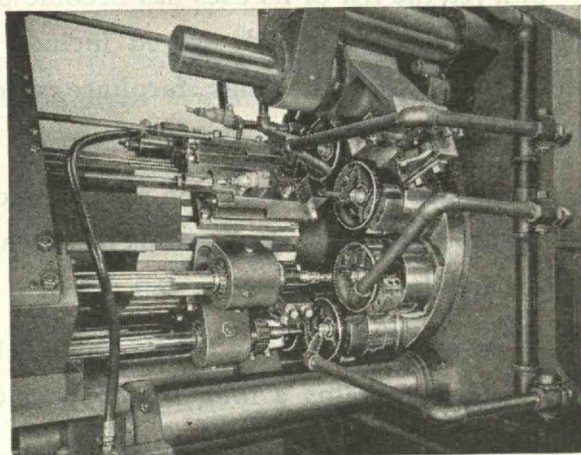
This difficult machining of an aluminum alloy motor end frame is but one of many outstanding applications of New Britain automatics . . . bar and chucking machines that are establishing new records daily for accurate and economical production. To manufacture your peacetime quality product at less cost . . . machine it on a New Britain multiple spindle automatic.



Finished Aluminum Alloy Motor End Frame machined to exacting tolerances.

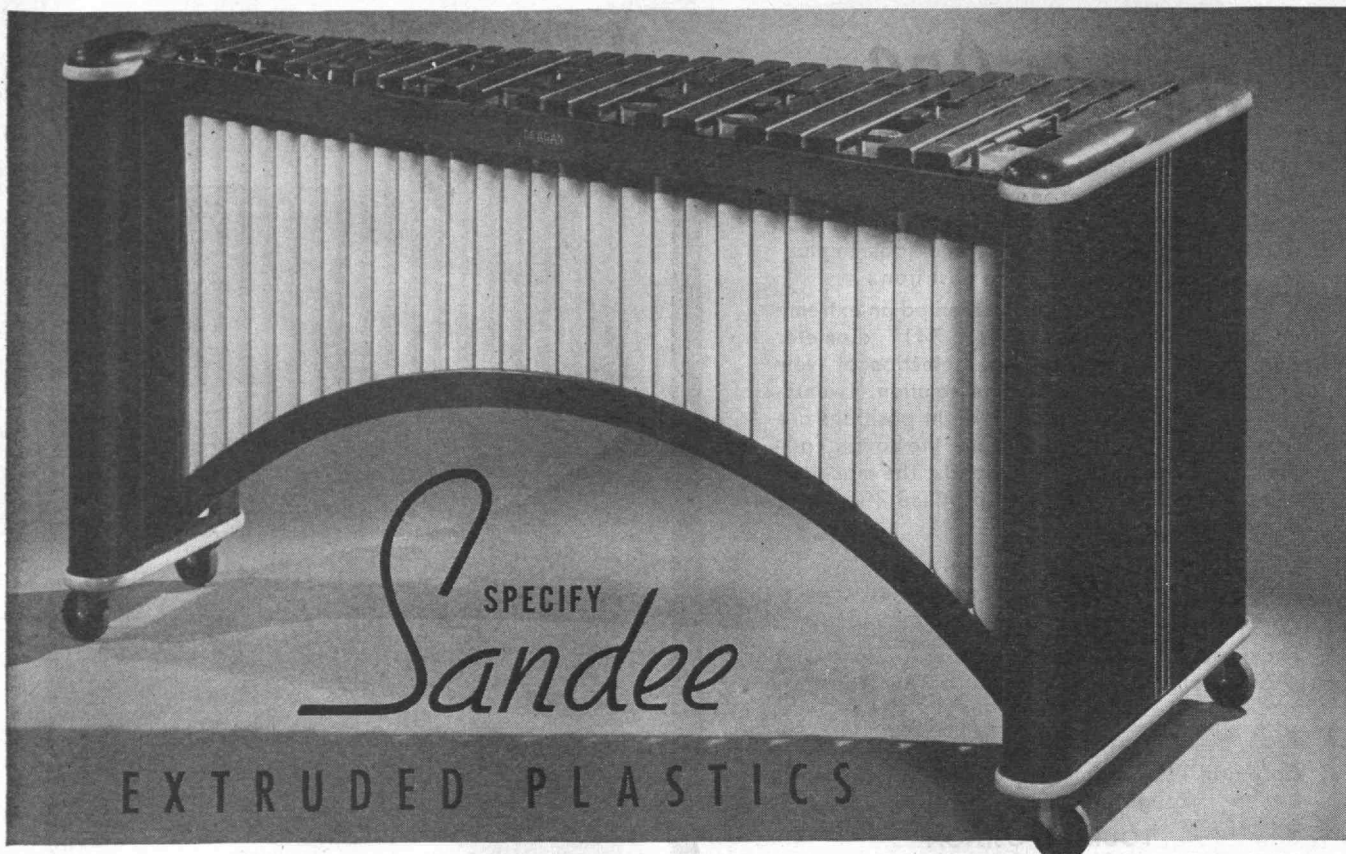


Front View of a New Britain Model 88 used in finishing the motor end frame . . . Note accessibility through open end construction.



Rear View of a Model 88 shows relationship of cross arms to toolslide . . . Permitting more efficient tool layout and production.

The New Britain machine line includes four, six and eight multiple spindle automatic bar machines up to $2\frac{1}{2}$ " capacity. Also a wide range of four, six and eight multiple spindle automatic chucking machines up to 12" capacity.



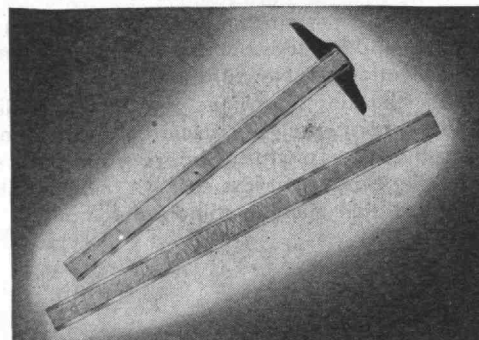
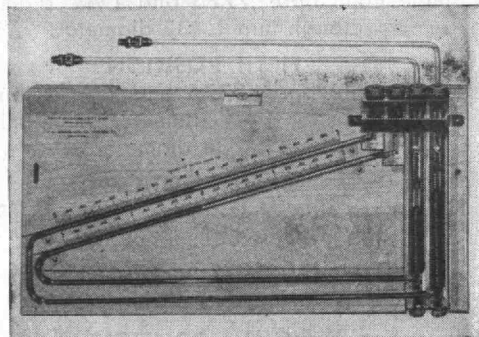
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ELMER SZANTAY, M.E. '35
General Manager

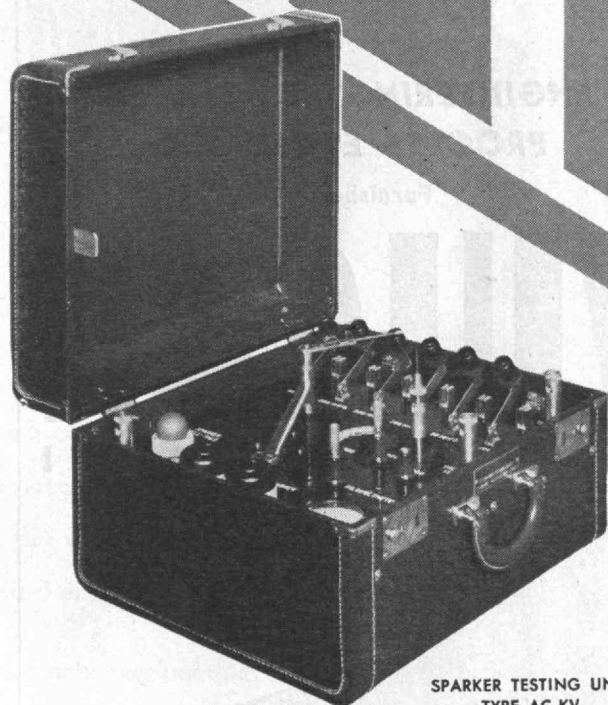


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Fault relay sensitivity is tested by placing variable series capacitances (from 25 to 575 micro-microfarads) in the test (high-tension) circuit of the wire sparker.

The unit is furnished complete with needles, attachment cords and fittings, is enclosed in an imitation leather case, 17½" x 15" x 11", and weighs only 26 lbs. Electrical parts are mounted on a hinged bakelite panel, with space underneath for accessories.

Send for specification sheet

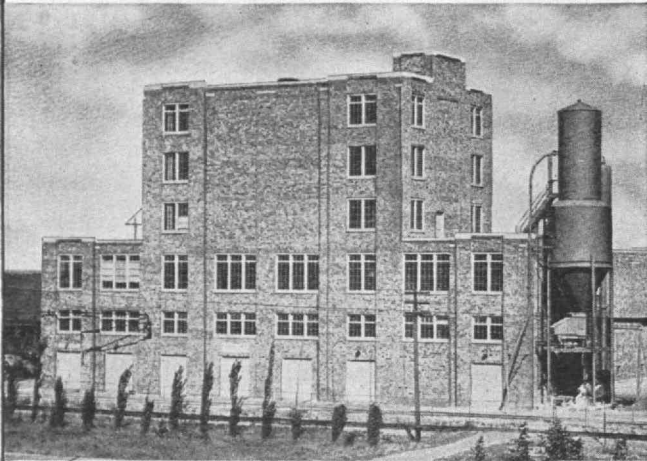
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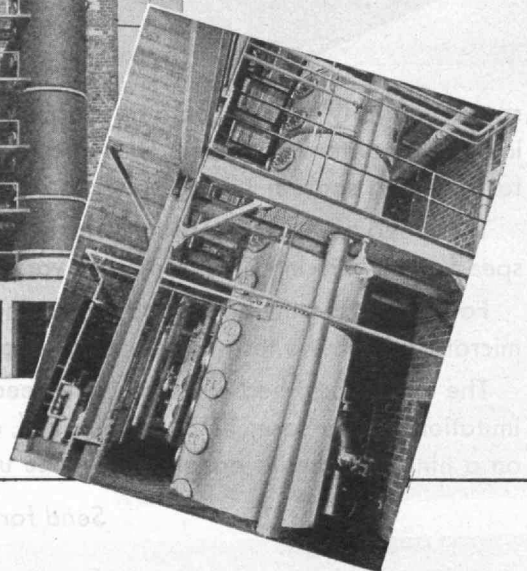
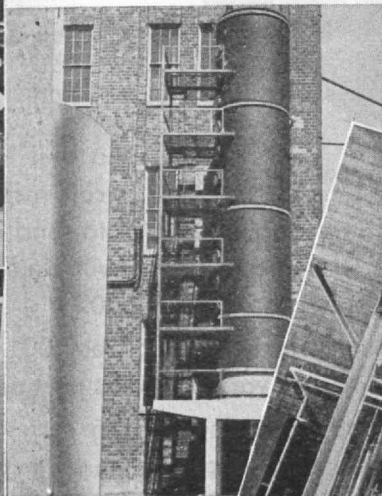
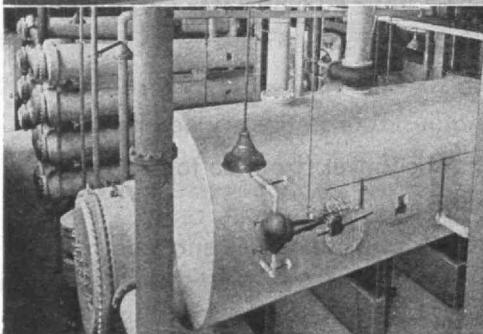
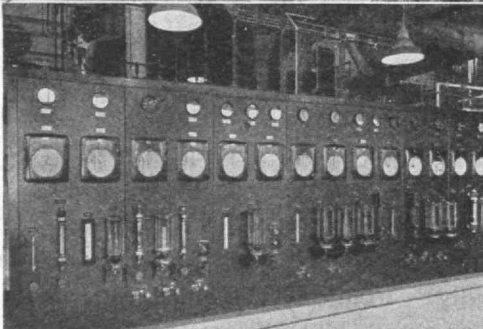
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Backed by craftsmanship which has become famous, this engineering service is largely responsible for the predominance of American

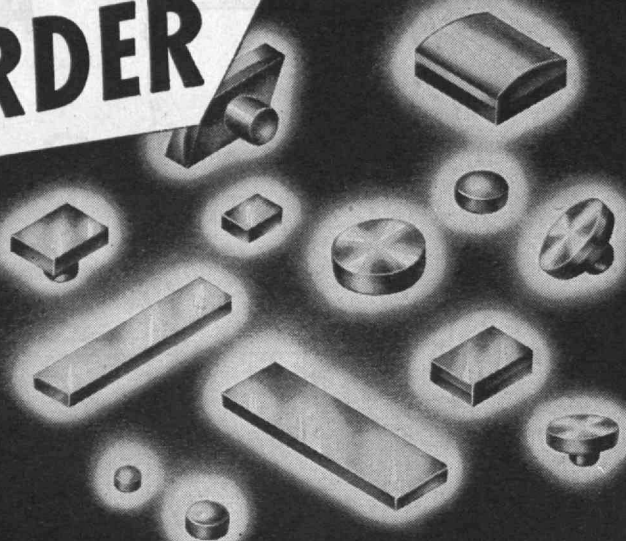
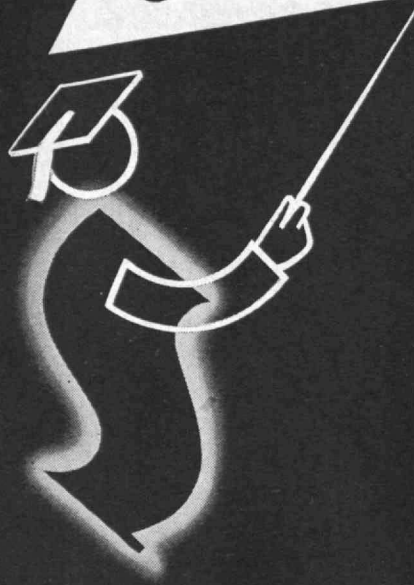
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AMERICAN BOSCH CORPORATION • Springfield 7, Massachusetts

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tremendously. Operating against a silver tungsten contact on an actual circuit breaker application, the material has proved its ability to withstand up to 15,000 amperes under short circuit conditions!

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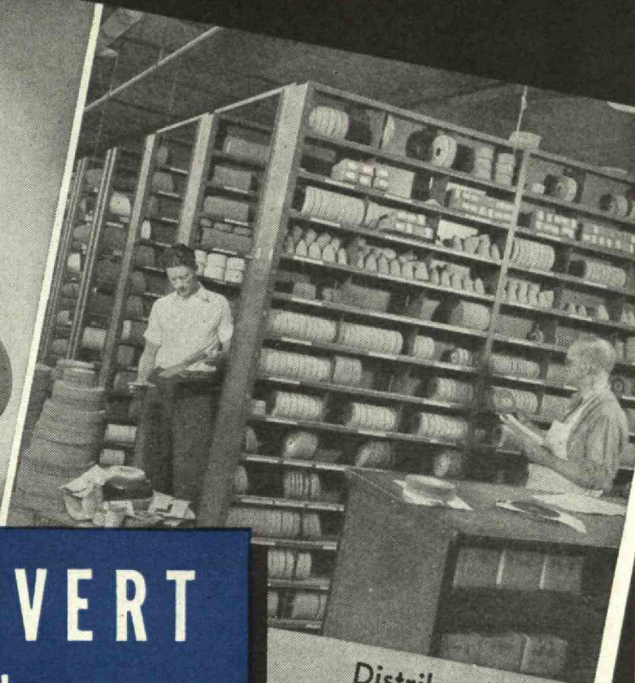
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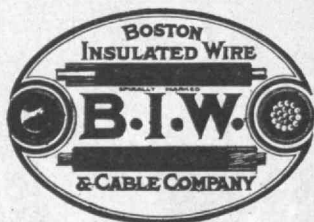
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THE TABULAR VIEW

Majestic Manhood. — Observing the heat produced in the boring of cannon, Benjamin Thompson (better known as Count Rumford) correctly described heat as a manifestation of motion. This observation — and the conclusions drawn from it — stimulated others to further research in heat in which Rumford was greatly interested. But Rumford was not only a scientist; he was an able administrator, a military leader, and a Woburn-born Tory. DUGALD C. JACKSON, Professor Emeritus and former Head of the Department of Electrical Engineering at the Institute, paints a vivid portrait (page 21) of Count Rumford as a majestic, if temperamental, man.

Magnificent Melioration. — Modern example of war research applied to civilian service is given (page 23) in "Expanded Horizons," a story of the legacies of hundreds of scientists whose work at the Institute's Radiation Laboratory resulted in the development of microwave radar systems. Not the least of these gifts is the greatly expanded electromagnetic spectrum which has been opened for communication purposes. The record of the Radiation Laboratory comes from no less authorities than L. A. DU BRIDGE and L. N. RIDENOUR. Dr. du Bridge, on leave from his duties as dean of science at the University of Rochester, has been director of the Radiation Laboratory since its inception. Dr. Ridenour is presently engaged in a publication program which will make known the unclassified developments of the laboratory.

Medicine Man. — There are numerous instances in which the primitive medicine man has made worthwhile contributions to the world's medical knowledge. Without benefit of our instrumentalities for research and working against a cultural background foreign to us, primitive man has not fared badly. As is shown (page 27) by M. F. ASHLEY MONTAGU, associate professor of anatomy at the Hahnemann Medical College and Hospital of Philadelphia, the practices of the medicine man are quite logical and consistent with primitive man's beliefs of the nature of the world about him.

Machine-made Mathematics. — Foremost giant of the Institute's Center of Analysis is the new differential analyzer put to work on war research projects in 1941. SAMUEL H. CALDWELL, '25, Associate Professor of Electrical Engineering, who has long been associated with the Institute's expanding
(Concluded on page 12)

**Speed with
Economy**



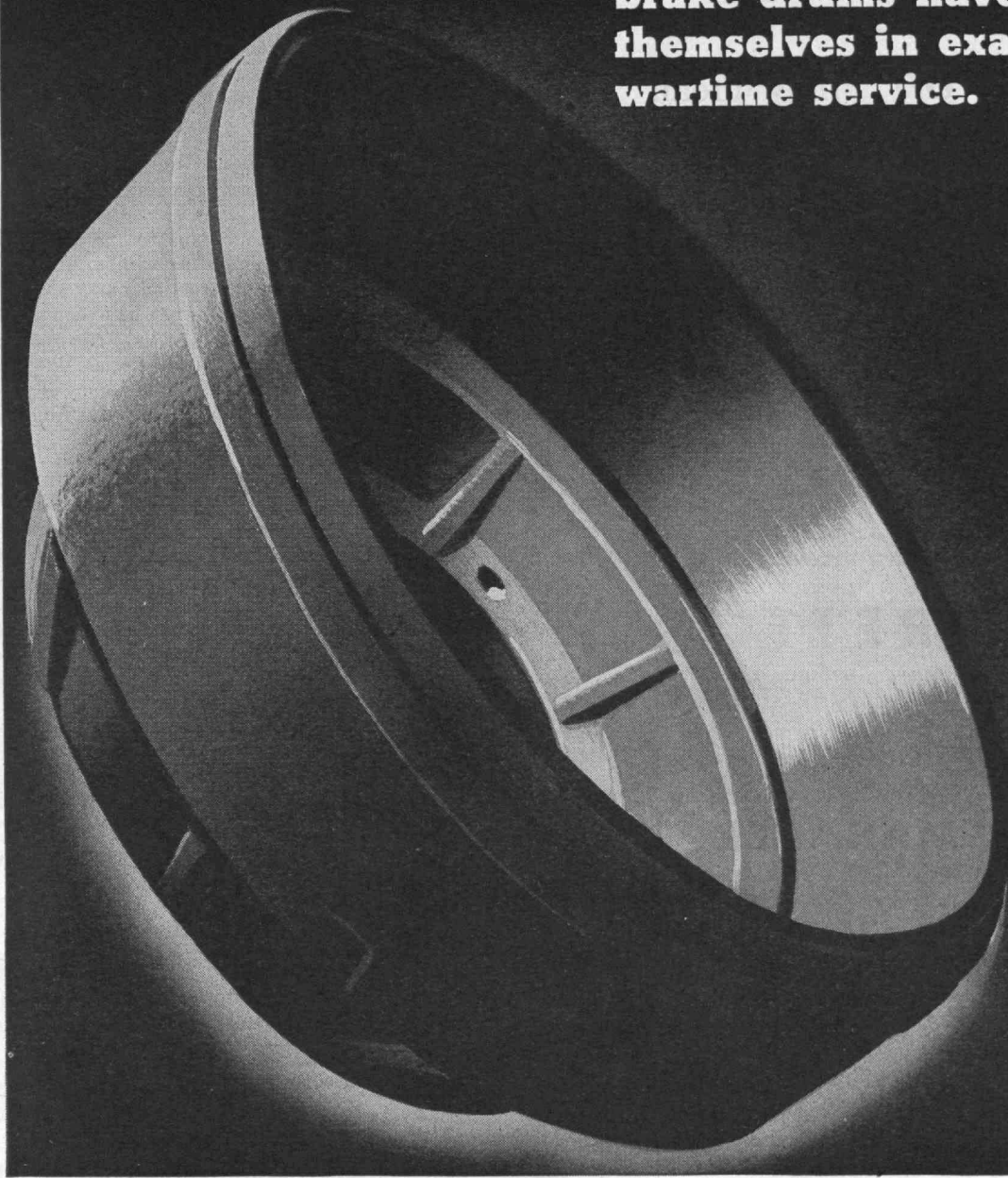
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Checking the angle on a connection form die with a Starrett Bevel Protractor at Curtiss Wright, Buffalo.

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THE TABULAR VIEW

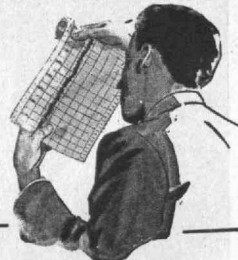
(Concluded from page 10)

program of machine computation, writes an authoritative article (page 31) on the new analyzer. Described as a machine to solve ordinary differential equations, the differential analyzer provides solutions to problems which are anything but ordinary, and it does so with a considerable saving of time as compared with manual computations.

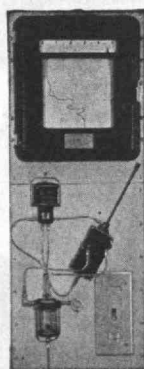
Master Mason. — Within 50 miles of the nation's largest city may be found beaver dams and lodges of recent origin. These animal-fabricated structures stand out in bold contrast to man-made edifices but serve man well by storing rainfall for gradual release as needed and in minimizing erosion. Although certain of the beaver's activities are destructive, many pleasant hours of watching nature's engineers at work have convinced FREDERIC W. NORDSIEK, '31, that, in the long run, beaver dams and lodges are beneficial to man. An Editorial Associate of The Review and a frequent contributor on topics of food technology and public health, Mr. Nordsiek departs from his usual fields to write (page 35) of beaver activities.

Managerial Manifesto. — The unexpected speed with which the Japanese overran large areas of Asia and the Pacific islands after the attack on Pearl Harbor deprived this country of large quantities of much needed tin. With no suitable substitute for tin as required for the metal containers needed by our armed forces, management called for a program of drastic tin conservation, and engineers went to work to develop improved tin-coating methods. The results of this program are reported (page 37) by J. C. WHETZEL, '17, assistant manager of sales for the Carnegie-Illinois Steel Corporation.

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Cambridge Gas Analysers provide continuous records, accurate and automatic. No intermittent sampling . . . no chemicals. These Analysers are used for determination of



OXYGEN in flue and stack gases and in furnace atmospheres

CARBON DIOXIDE in flue gases

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CARBON MONOXIDE, NITROGEN, ARGON and many other gases can be determined by available Cambridge analysers designed to meet specific industrial conditions.

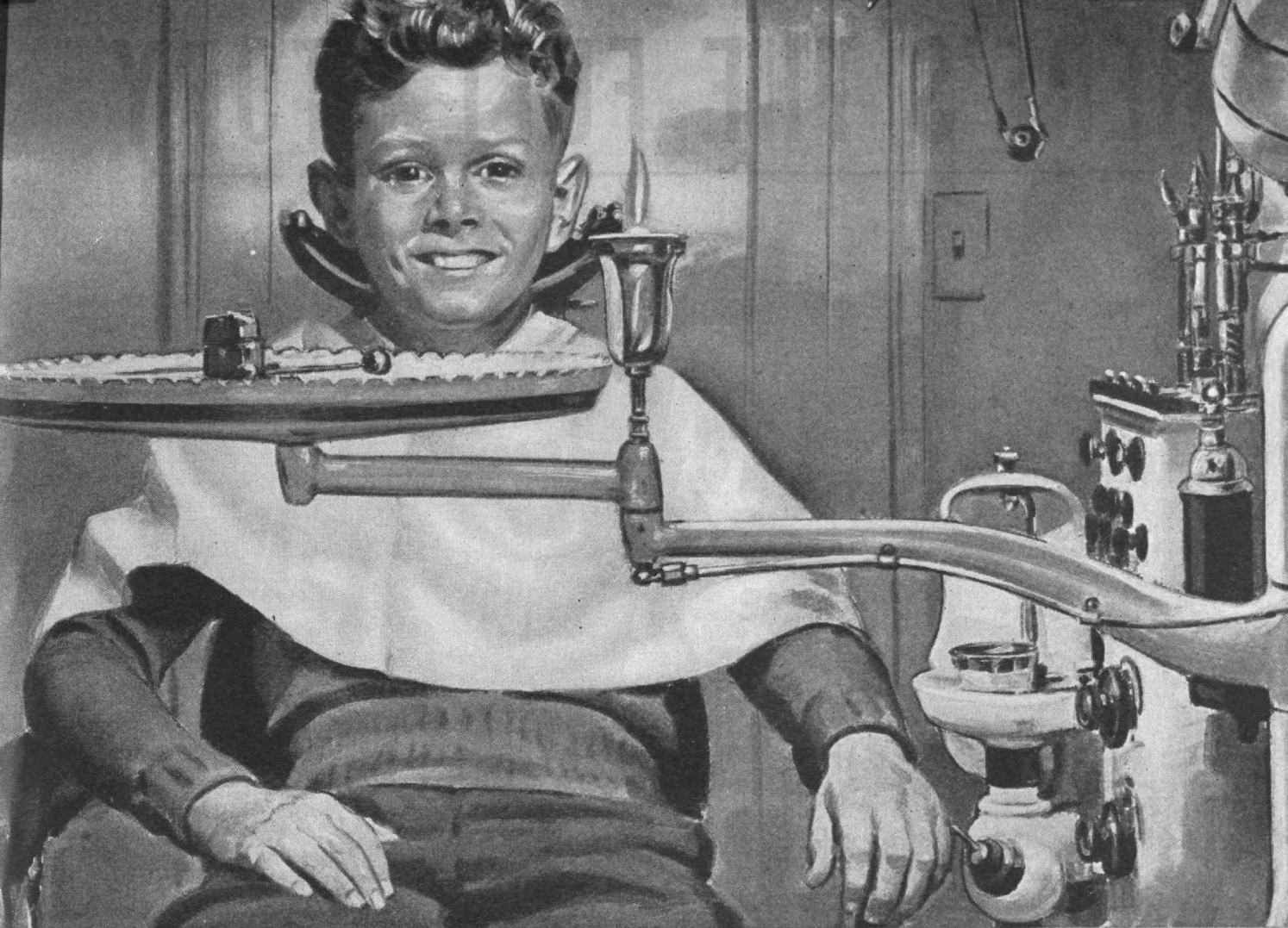
Cambridge four-point gas analyser provides simultaneous analysis and continuous graphic record of the amount of O₂, CO₂, CO and H₂ in a sample of combustion products.

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OUR YOUNG FRIEND means exactly that. He wasn't hurt a bit. And what happened to him is now the rule—not the exception.

For today dentists—as well as physicians and surgeons—have at their disposal many safe and effective pain preventives.

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Sir Humphry Davy, who first discovered the anesthetic effects of nitrous oxide back in 1800.

Regardless of the type of pain preventive which may be selected to meet your requirements, you may be increasingly confident of its purity and effectiveness.

For the pharmaceutical manufacturers who make *anesthetics* and *analgesics* now have available to them a wide variety of scientifically produced synthetic organic chemicals from which to select their raw materials. The quality and potency of these chemicals are of assured uniformity because they are man-made under strict, scientific control. And, untiring research is continually increasing the number available for use in the prevention of pain.

Many of today's synthetic organic chemicals were developed through research by CARBIDE AND CARBON CHEMICALS CORPORATION. More than 160 of these chemicals are now produced as raw materials for industry by this one Unit of UCC. Among these are diethylethanolamine used by pharmaceutical manufacturers as an intermediate in the preparation of novocaine so familiar to dental practice . . . acetic anhydride used in the synthesis of aspirin and other analgesics . . . and others like ethyl ether, ethanol, dichlorethyl ether, dimethylethanolamine, and methyldiethanolamine, which serve in important ways in the preparation of pain preventives.

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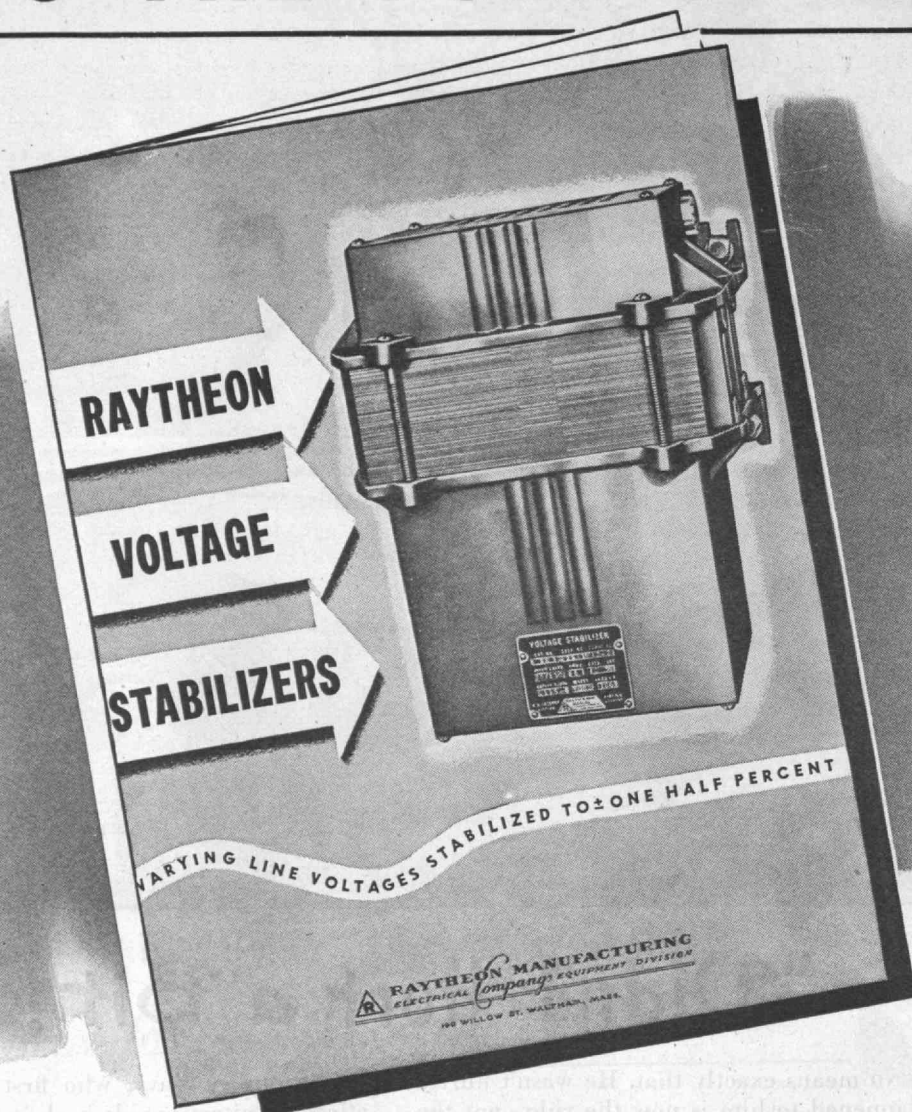
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Vannevar Bush, by Eugene Montgomery

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Official U. S. Coast Guard Photo

Pacific Convoy at Sunrise

THE TECHNOLOGY REVIEW

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November, 1945

The Trend of Affairs

Postwar Research

PROGRESS in scientific research and development is an indispensable condition to the future welfare and security of the nation. The events of the past few years are both proof and prophecy of what science can do." With these words, President Truman, in his message to Congress on September 6, brought before Congress, and the public at large, recognition of the great dependence which modern industrial nations place on their scientists and engineers.

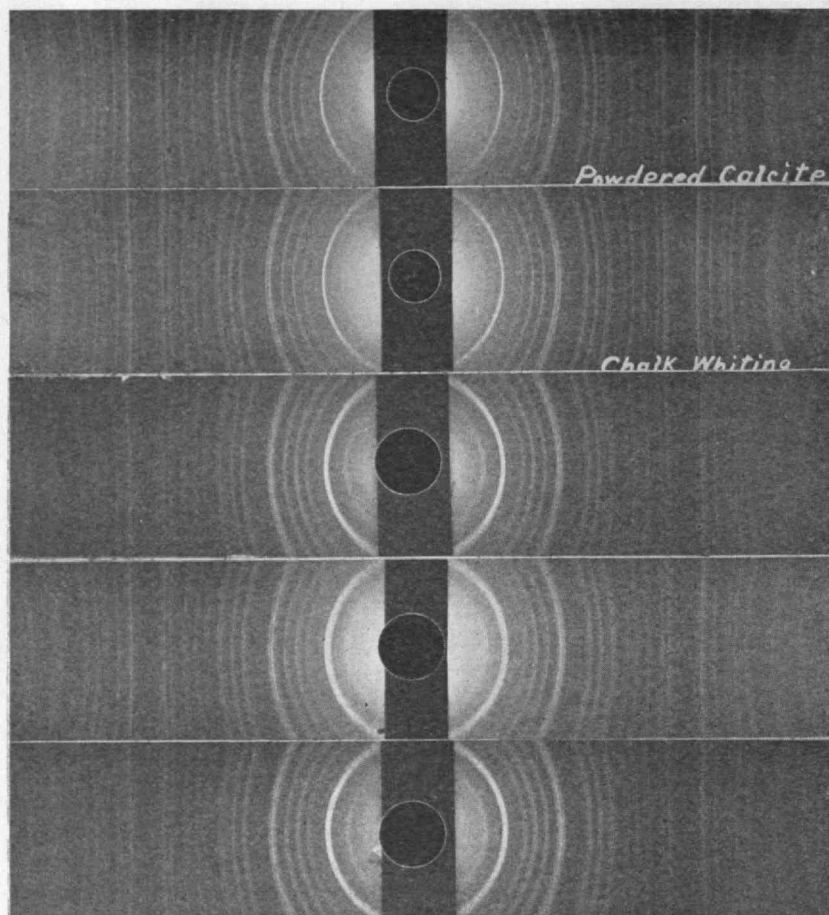
That industry is more than anxious to make its own contribution to the welfare and security of the country is attested not only by the active program of recruiting technical personnel as rapidly as it is released from war activities but also by creating new centers of industrial research. Laboratories marked for new construction or expansion in the near future include, among others, the Bell Telephone Laboratories, Murray Hill, N. J.; RCA Laboratories, Princeton, N. J.; E. I. du Pont Laboratories, Wilmington, Del.; General Motors Technical Center, Detroit, Mich.; Electronics Park of General Electric Company, Liverpool, N. Y.; and the research laboratories of Johns-Manville Corporation, Bound Brook, N. J., and the Reynolds Metals Company, Inc., Cambridge, Mass.

Colleges and universities are likewise intensifying their research facilities. Dr. Compton's annual report (summarized in this issue's "Institute Gazette") announces plans for a number of new laboratories and research centers whose formal opening will be recorded in future pages of *The Review*. The University of Chicago will establish an institute of nuclear physics; a new structural research laboratory will be built at the University of Washington; and Union College intends to augment its physics laboratories. In the field of public health, Columbia University and the Presbyterian Hospital are to operate a hospital and health center for the study of tropical and communicable diseases, and Ohio State is soon to erect a new health center. This list, compiled at random

and by no means complete, may, however, indicate the extent of new collegiate research.

Government also shows dissilience in organized research. President Truman urged the early adoption of legislation for the establishment of a single Federal research agency not only to promote and support fundamental research and development projects in the physical and medical sciences, public health, and allied fields but also to provide financial assistance in the form of scholarships and grants for young people of proven ability in scientific research. Such an agency is also to co-ordinate and control diverse activities now conducted by the several departments and agencies of the Federal Government, including those relating to national defense. A clue to the type of research agency which the government will administer may be found in the several bills, introduced in both the House and the Senate, which are under discussion as this issue goes to press. The requirements of such an agency are admirably set forth in *Science, the Endless Frontier* by Vannevar Bush, '16, and his colleagues.

More than any other single factor, the war has brought to the public consciousness the effectiveness of research and the scientific method. Certain dramatic products of war research may have tended to obliterate temporarily the fact that the products of science and technology are predominantly beneficial to man and that the scientific method is as applicable to the furtherance of peace and the humanities as it is to war and destruction. Institutes of higher learning in this country are sponsoring reforms in their research laboratories, reforms for the benefit of mankind. The nation's progressive citizens welcome the vast program of collegiate and industrial research as a coadjuvancy of the sciences applied to peace. Application of the scientific method to the social sciences and in promoting the humanities may well become a tremendously effective means of solving man's social problem and therefore constitute the most significant achievement of future generations. The Institute's Research Center for Group



(A) Powdered calcite

(B) Chalk whiting

(C) Oystershell

(D) Giant ostrich eggshell

(E) Dinosaur eggshell

Dynamics is one example of a laboratory applying its resources to investigation in this direction. In all fields — the pure and applied sciences alike — scientists have voiced the necessity for applying their knowledge to that most important phase of human development — the general advancement of man's moral code.

Dinosaur Eggs and Iceland Spar

THAT nature works slowly in the evolution of crystalline forms of shells has been demonstrated by x-ray diffraction patterns made by Professor Bertram E. Warren, '23, of the Department of Physics. These show that the crystal structure of the shell of the modern poultry hen is identical with that of the giant ostrich egg — a mere 1,000 centuries old — and also with that of the dinosaur egg which has attained the rather ineditably ripe old age of approximately 100,000,000 years.

The diffraction patterns were made by sending a beam of x-rays through a small lump of crystalline material which has been pulverized. Each plane of the crystal diffracts the x-rays to form a cone of radiation which is photographed on cylindrical film. The intersection of these cones with the film produces the diffraction pattern which is symmetrical about its center. The appearance of the pattern — the positions and relative intensities of the lines — is characteristic of the particular crystal structure, and thus these patterns can be used to identify the crystal just as fingerprints identify an individual.

An unknown crystal can be identified by matching its diffraction pattern with one that is known. Diffraction patterns provide more information than chemical analysis because the same chemical compound may have several

different crystalline forms. For example, calcium carbonate, CaCO_3 , forms three diverse crystals — calcite, aragonite, and vaterite. The powder patterns of the three forms are different and can be used not only to identify the material as calcium carbonate but also to determine the crystal form.

Substances which look quite different to the eye may still have the same crystal structure, as the illustration shows, for the diffraction patterns in all cases are identical. The sample for obtaining the calcite pattern (A) was obtained by grinding a small piece of Iceland spar. The second sample (B) was English chalk whiting powder. Most people think of chalk whiting as an amorphous form of calcium carbonate, but its pattern definitely labels it as calcite in the form of very small crystals. The third pattern (C) from a small bit of finely ground oystershell, shows that living creatures can produce calcite.

The two rare and ancient specimens (D) and (E) were obtained by grinding eggshells of the giant ostrich and of the dinosaur. The shells were furnished by Professor Frederick K. Morris of the Department of Geology who had collected them while on a central Asiatic expedition of the American Museum of Natural History. The ostrich shells were found in deposits of the Ice Age on the smooth upland surface of the Gobi Desert and are about 100,000 years old or more. The dinosaur eggs were found in the red sandstone of the Age of Reptiles in the western part of the Gobi Desert north of the Altai mountains and are roughly 100,000,000 years old.

The giant ostrich and dinosaur eggshells have the calcite structure of Iceland spar or chalk whiting. The same calcite form of crystal exists in the oystershell, a lobster claw, or the modern hen's egg, although diffraction pat-

terns for the latter two are not shown. At the time the egg-shell patterns were being made, the predictions were that the giant ostrich and dinosaur eggshells would have altered during their many millenniums in the ground and that the diffraction pattern would reveal that some other substance had replaced the eggshell, as silica replaces vegetable matter in fossils.

Indeed, there is good reason for believing that a process of recrystallization has occurred within the material of the shell which would present to the discoverer a totally different substance from that constituting the original shell. It is surprising that some other substance has not crept in to replace the crystals of the shells in the thousands of years during which they lay unnoticed in the desert. The diffraction patterns show that today we are able to look upon the very atoms which passed through the mother's body to make the shells for protecting her young. In the building of shells, nature has made little change in the materials and styles with which she works.

Benjamin Thompson: Count Rumford

BY DUGALD C. JACKSON

WHATEVER may have been the half-formed thoughts fluttering in the minds of scientists toward the end of the Eighteenth Century, there can be no doubt but that Count Rumford's intellectual curiosity (which led him into his great experiment on the heat produced by cannon boring) and the vigorous exposition of his work and the conclusions he derived from his experiments led to acceptance of the truth that heat is no tangible substance but is rather a mode of motion. Here is a fundamental discovery of a phenomenon of nature.

Rumford's conclusions started the wonderful chain of inquiries and experiments that led, through the work of Davy, Carnot, Joule, Helmholtz, Mayer, and Kelvin, to our definite recognition of the conversion of energy at fixed ratios from type to type and to the theory of the conservation of energy. Now, through the work of J. J. Thomson, the Curies, and a wide group of investigators and philosophers, we have come to recognize that under certain conditions energy and matter are interconvertible in fixed ratios. Rumford thus started the chain of investigation leading to a vast amount of our present science and its applications which contribute to man's welfare. It is impossible to estimate limits to the advantages which flow to man through the application of the theory of the conservation of energy and which will continue to flow from applications of the extended theory of the conservation of energy and matter.

Rumford's interests were diversified for, besides following successfully various fields of science, he did well in government, in military service, and in diplomacy. He was made a fellow of the Royal Society of London in 1779, and his most famous paper on heat was presented before that society in 1798. Ultimately, Rumford became a member of various leading academies in continental Europe. In 1799, Sir Joseph Banks aided him in the establishment of the Royal Institution in London, which was chartered in 1800. It is said that Rumford himself made the most fortunate choice of Sir Humphry Davy as the resident scientific lecturer in the institution.

Count Rumford, born Benjamin Thompson in Woburn, Mass., in 1753, was of Tory mind in youth and an ardent Tory during the Revolution. By conviction he could not

agree with his revolutionary fellow colonists. He withdrew from their midst and removed to England as a British subject, being knighted there in 1784. He even adopted a military life on the loyalist British side, received a commission in the British army, and commanded a unit of British troops in America near the end of the Revolutionary War.

But the traditional generous American tolerance followed him in his later days. His administrative ability was recognized in 1799 when he was offered the superintendency (which he declined) of the new United States Military Academy, which developed into our cherished West Point. His scientific achievements were no less recognized. American men of learning accepted Count Rumford as worthy of brotherhood in the American Academy of Arts and Sciences by making him a fellow in 1789 when his old Woburn friend Loammi Baldwin was a member of the Council. The academy, established in 1780 with James Bowdoin, governor of Massachusetts, as its president, listed among its members many notable figures. By 1781, Benjamin Franklin and George Washington were among the fellows of the academy, the membership of which in time included Thomas Jefferson, elected in 1787, Sir Joseph Banks, in 1788, and Alexander Hamilton, in 1791. Loammi Baldwin, elected in 1782, was, like Rumford, a man of many valuable activities, and his hobby in horticulture had an interesting outcome in the still well-known Baldwin apple.

Although Rumford knew and associated with the great men of his times, to whom he is often compared, we must recognize a personal distinction between him and such men as Washington, Jefferson, Hamilton, Franklin, and Faraday. The Count was indeed genius-gifted, as he has been denominated. Contrary to the others mentioned, he was erratic and self-interested, with apparently little sense of true patriotism, and these qualities limited his influence to a level lower than that to which it might otherwise have risen. Nevertheless, he left a profound heritage, least known of which are, perhaps, his gifts to scientific societies.

It was in 1796 that Rumford made a gift of £1,000 to England's famed Royal Society to establish a semiannual grant in recognition of discoveries or useful improvements in heat and light. In the same year he sent to the American Academy of Arts and Sciences in Boston the gift of \$5,000 in 3 per cent stock of the United States. This gift was accompanied by a letter to John Adams, then President of the academy, dedicating the interest of the fund to be used in perpetuity for the biennial premiums to the author of the most important discovery or useful improvement, "which shall be made and published in any part of the continent of America, or in any of the American islands, during the preceding two years, on Heat or on Light; the preference always being given to such discoveries as shall, in the opinion of the Academy, tend most to promote the good of mankind."

It was some years before this fund came into use for the designated purpose, and it was necessary for the courts to determine the authority of the academy to make reinvestments of the money as the stock of the United States was redeemed. There have now been 41 awards, and the names of a few of those honored will indicate that the plan has proved its merit in giving encouragement for great work within the designated field. The first five recipients were: Robert Hare, for his invention of the

compound or oxyhydrogen blowpipe; John Ericsson, for his improvements in the management of heat, particularly as shown in his caloric engine of 1858; Daniel Treadwell, for improvements in the management of heat, embodied in his investigations and inventions relating to the construction of cannon of large caliber and of great strength and endurance; Alvan Clark, for his improvements in the manufacture of refracting telescopes, as exhibited in his method of local correction; George H. Corliss, for his improvement in the steam engine. Those of us whose memories reach back far enough can testify to the notable effects of these contributions in the useful applications of heat or light. All of us who follow physical science or engineering can equally testify with regard to the last five recipients: Harlow Shapley of the Harvard Observatory, for researches on the luminosity of stars and galaxies; William W. Coblentz of the National Bureau of Standards, for pioneer work in the technology and measurement of heat and light; George R. Harrison, Professor of Physics at M.I.T., for his improvements in spectroscopic technique; Vladimir K. Zworykin, of the Radio Corporation of America, for his invention of the iconoscope and other television devices; and Charles E. K. Mees, of the Eastman Kodak Company, for his contributions to the science of photography. Karl T. Compton received the award in 1931 for researches in thermionics and spectroscopy. Rumford's encouragements to science have therefore twice brought honor to the Institute's Faculty.

In his will Rumford left a bequest to found the "Rumford Professorship in Physical and Mathematical Sciences and their Useful Applications" at Harvard University. This professorship is held by Emory L. Chaffee, '07.

Rumford was a scientist of distinction. In his judgment of human contacts and social welfare he was notably sympathetic as well as judicial. But there is positively no inkling here of precedent for tolerance toward the participants in barbarian or criminal acts committed in these present wars, however eminent in other fields may be those participants.

It seems then that the most impressive aspects of Rumford's genius are his recognition and efforts toward the application of scientific knowledge for the welfare of man. The stipulation for the income of his gift to the American Academy of Arts and Sciences bears witness to his desire that science shall serve mankind, and this desire reminds me of a statement which I was inspired to make in a brief biographical memoir of Frank J. Sprague, who was my lifelong admired friend and at one time my "chief" in a rapidly developing industry: "If all the world would permanently embrace peace and live with industry and thrift, while encouraging creative inventors to show the way to convenience and comfort, we soon would enjoy a wealth, health and happiness near to the millennium."¹ Rumford's experimental discoveries emphasize the same thoughts and lead us to remember that creative inventors utilize every ounce of science that comes into their hands, and that "wealth, health and happiness" comprise a unit of combined merit. In such a unit, wealth means a sufficient assured income, in response to sound work, to provide an individual and his dependents with sufficient food, clothing, and shelter for comfort and a reasonable degree of education and recreation, without connoting notably great possession of property.

¹ "Frank Julian Sprague, 1857-1934," *Scientific Monthly*, November, 1943, p. 431.



A halfpenny of I. Fowler of London, depicting the method of whale fishing at the end of the Eighteenth Century



Halfpenny token coin issued by J. Smyth, showing the Padsole Paper Mill at Maidstone, Kent

Token Coinage

DURING the late Eighteenth and early Nineteenth centuries token coinage flourished in Great Britain. The government's failure to supply a sufficient quantity of copper coin for small change left the merchants with such an inadequate supply that they were forced to take matters into their own hands by issuing tokens which were merely promises to make payment in legal tender. Numerous privately owned mints sprang up, and soon there was hardly a commercial center in the United Kingdom which did not have a large circulation of tokens bearing the names of its more important merchant houses.

The tokens were as varied and numerous as the merchant houses issuing them. Their design is of interest since many coins illustrate the activities of the houses by which they are issued and sometimes, as in the whaling scene pictured on one of the coins, give a good indication of the commerce of the times. The collection of such token coins became one of the fads of the day.

According to Waters¹ there were four classes of tokens in circulation during the period. There were, of course, the bona fide tokens bearing the merchant's name with his promise to pay the amount called for by the value marked on the coin. In addition, there were private tokens issued by certain wealthy coin collectors and used for exchange in their numismatic dealings with other collectors. Fictitious coins issued by private mints and bearing the names of nonexistent merchants were by no means unknown and were sold to collectors in stimulation of the then current hobby of token collection. Finally, there were tokens issued by private mints, without local names, to be sold by weight to whoever wished to buy them for trade convenience and to serve in a measure something like the present-day traveler's checks.

From the time of Charles II the sparse small change that had been issued was a mixture of various metals, of diversified and nonstandard sizes and of varying but generally crude workmanship. Forgers had an easy time with the King's coins, for to imitate a (*Continued on page 70*)

¹ Arthur W. Waters, *The Token Coinage of South London* (Leamington Spa, 1904).

Expanded Horizons

In Developing Microwave Radar Systems for Military Purposes the Radiation Laboratory Bequeaths to Civilian Use a Wide Range of Developments in Electronics and Radio Techniques

BY L. A. DU BRIDGE AND L. N. RIDENOUR

THE Institute's Radiation Laboratory is fast becoming one of the legendary products of the war. This technological Willow Run plant, begun in November, 1940, with a staff of slightly more than 20 members, mushroomed into an organization of more than 3,800 persons with a monthly budget of \$4,000,000 by the time the Japanese surrendered. The laboratory was charged with the development of microwave radar equipment and systems at a time when the instrumentalities for accomplishing such a project were unknown. Yet the success and importance of its part in winning the war are indicated when it is realized that of the \$2,700,000,000 worth of radar equipment delivered to the armed forces by July 1, 1945, \$1,600,000,000 represented expenditures for microwave equipment. Representatives of the laboratory have directed the installation and operation of microwave radar equipment on every major war front. But although the laboratory is known primarily for its importance to

this country's war program, it is completing its work by recording, for peacetime uses, the significant developments which came to light when the nation's scientists and engineers gathered in Cambridge for one of the largest co-operative scientific undertakings yet known.

The predominance of the Radiation Laboratory in the microwave radar field is intimately associated with, and results from, the state of development of electronics in England and the United States five years ago. In the fall of 1940 our Army and Navy laboratories were fully committed to the transition from the laboratory to the manufacturing stages of long-wave radar systems which they had developed during the preceding few years. Although this country was arming for war, these laboratories had neither the time nor the effort to spare in pursuing a bird in the bush, however promising; and although more promising than the "long-wave" radar operating at 1.5 meters, microwave radar was a bird in the bush in 1940.

Fortunately, the National Defense Research Committee had been set up during that summer, and one division, headed by President Compton, had appointed a committee to study and develop microwave radar techniques. The microwave committee, as it was called, had as its chairman Alfred L. Loomis, a member of the M.I.T. Corporation. After a preliminary survey of United States developments in this field, the committee recognized the discouraging fact that the success of microwave radar systems depended upon the availability of means for producing large amounts of power at wavelengths much shorter than 1.5 meters.

Just then, in the fall of 1940, a British scientific mission to the United States, headed by Sir Henry Tizard, brought over and revealed to our services and to the N.D.R.C. the cavity magnetron. This was a new type of electron tube, capable of developing about 10 kilowatts of radio-frequency power at a wavelength of 10 centimeters — the single device which made possible microwave radar. Such power at these frequencies had never been heard of previously, and it was clear to the microwave committee that the new magnetron would make the development of microwave radar feasible. The microwave committee offered to assume responsibility for the development of microwave radar, and the Army and Navy, busy as they were with their own radar programs, gratefully accepted.

Britain's radar project had not begun until 1935, but by 1940 it had developed the great Home Chain of long-wave stations (which had already won the Battle of Britain) as a result of a vigorous research and development program which produced the first airborne radar equipment for military use and the cavity magnetron. These astonishing achievements had been made by civilian scientists



All photographs from M.I.T. Radiation Laboratory
L. A. du Bridge, director of the Radiation Laboratory
since 1940



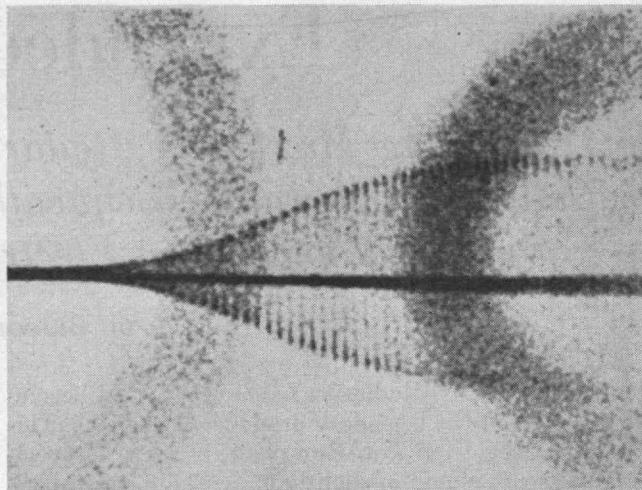
Radar field station at Eastern Point near Gloucester, Mass. At the top of the tower may be seen two parabolic reflectors, typical of radar antenna installations.

working in laboratories organized and financed by the government. Most of the scientists were physicists rather than engineers or radio specialists, and many had specialized in nuclear physics.

The inference was clear. It was decided by N.D.R.C. that the United States would probably be wise in setting up similar facilities for conducting research for national defense at government expense. But whereas Britain's Army, Navy, and Air Force had each set up their own laboratory, N.D.R.C. could — and did — establish a single laboratory in the United States to serve both our armed forces. This divergence from British procedure was probably a more important advantage than was first realized. By concentrating all effort in a single research center, duplication of effort was eliminated, technical personnel was used most effectively and efficiently, and the Army and Navy both contributed their requirements and experiences during developmental stages, to their mutual advantage.

Recruiting for the new establishment was undertaken at once, and a survey of possible locations led to the choice of M.I.T. Staffed by a few nuclear physicists who knew little or nothing of conventional radio or long-wave radar, the Radiation Laboratory opened its doors (in Room 4-133) on November 11, 1940.

It was the unforeseen versatility and success of microwave radar which made the subsequent growth and effectiveness of the Radiation Laboratory possible. What might be called the corporate irresponsibility of the laboratory — which was derived directly from its setup under N.D.R.C., leaving the laboratory without explicit service control — has been a big factor contributing to its success. Many of the most effective weapons to come from Radiation Laboratory developments were quite reasonably



Oscillogram of the build-up of 3,000-megacycle-per-second oscillations in a magnetron, showing individual cycles resolved. Successive peaks on either side of the base line are spaced in time by only $1/6000$ of a microsecond. The ability to record individual cycles of signals at such high frequencies is, in itself, an accomplishment of importance.

regarded as misguided when they were in their earliest laboratory stages. A service laboratory might have regarded speculative research as a luxury which it could not permit itself. Amicable relations with the British, the services, and industry were necessary, of course, and the fullest co-operation has been enjoyed since 1940.

Because of the close co-operation which has marked the development of microwave radar throughout, it is next to impossible to allocate credit to specific institutions or individuals for particular developments. This will have to be attempted, in many cases, by patent lawyers; we shall not try it here. What we should like to do is indicate some of the things which the wartime development of microwave radar has bequeathed to peacetime technology. In doing this we shall not necessarily be claiming for the Radiation Laboratory entire credit for all these developments. We had a hand in all of them and a major part in some, but our purpose here is simply to describe them.

Let us remind you of the principles of radar. Radar is a scheme for locating objects which can, in principle at least, be seen by the eye. It makes use of a special type of radio transmitter and receiver adjacent to one another rather than separated in space as in the case of broadcast communication. The transmitter emits a sharply directed beam of radio waves, a portion of which are reflected or scattered from objects in the path of the beam and whose presence is to be located. The reflected echoes are detected by a special radio receiver, having cathode-ray tube equipment designed to indicate the direction and range of the source of the echoes. The transmitted signals may be continuous, or they may be regularly spaced bursts of energy, called pulses. Practically all of the radar equipment used in the war has used pulse-type transmission. Since only a very minute part of the transmitted energy is reflected and received, transmitters capable of producing pulses of very high power are required.

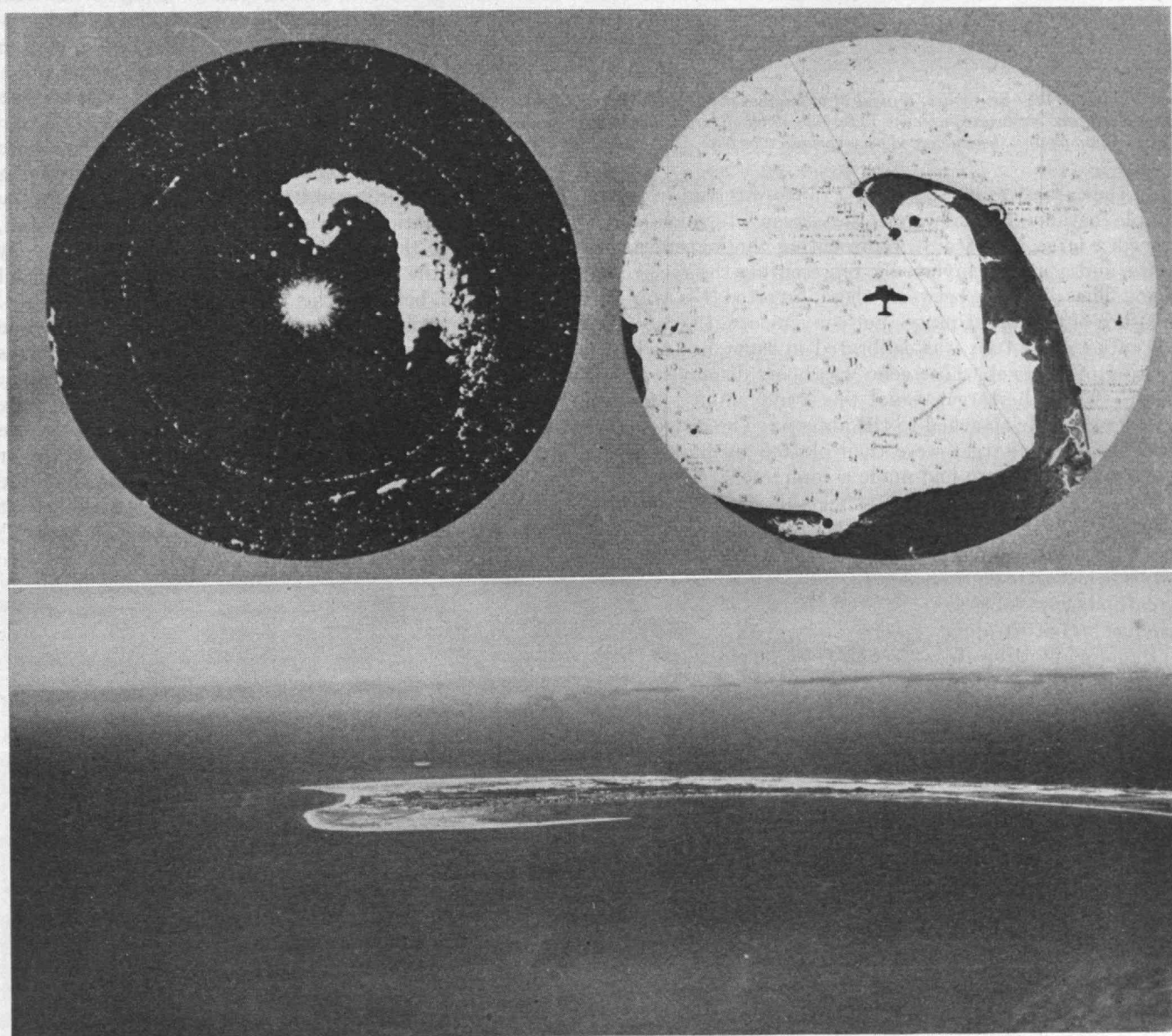
Radar enjoys two superiorities over vision. Since darkness, haze, smoke, and other similar obstacles to vision do not interfere with the transmission of radio waves, radar's vision is substantially the same under all conditions. Moreover, radar is able to measure the distance to the objects it "sees" with incredible precision. The way in

which this is done is simple. The time elapsing between transmission of the pulses and reception of the echo is a measure of the distance of the object, for light and radio waves always travel with the same fixed speed of 3×10^{10} centimeters per second, or 328 yards per microsecond. Since the waves have to travel both out and back, the time between transmission of a pulse and reception of an echo will be one microsecond for each 164 yards separating radar and target, or approximately 10 microseconds per statute mile.

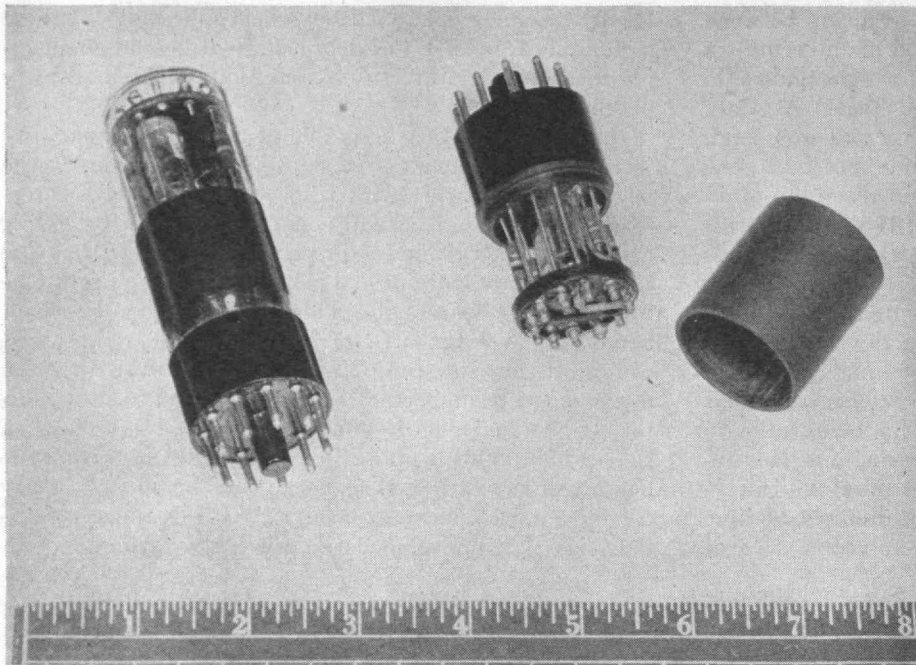
One of the big achievements of wartime research, with implications far beyond radar, is the development of methods for the precise measurement of time intervals of only a few millionths of a second. In fire-control radar there are sometimes distinct benefits in being able to measure target range to within ± 5 yards, and this requires the measurement of time to less than one thirty-millionth of a second! The precise measurement of time intervals of considerably less than a microsecond is one of

the by-products of radar research. Applications of these techniques to all sorts of detailed scientific and engineering measurements are so obvious that we need scarcely detail them.

Range of a target is only one of the measurements we require radar to make. We shall also want to know the bearing of the target with respect to us. Radar's directional properties are usually conferred upon it by giving the equipment a highly directive antenna so that the radio waves are sent out in a more or less sharp beam, like the beam of a searchlight. This beam can then be swept about to cover the area of space that the radar must watch; at the same time, information as to the direction in which the beam is pointing is transmitted to the operator. Maximum signal from a target will be received when the beam is pointing in the direction of the target, and the bearing of the various targets can thus be plotted in any convenient way. Several types of bearing-indicator systems have been developed and were used during the war.



Above left: An historic oscilloscope photograph used to show the properties of the plan position indicator. This picture, taken during the summer of 1942, led Britain and the United States to concentrate on the development of the bombing radar equipment operating on a wavelength of 3 centimeters. The radar photograph of the tip of Cape Cod is shown with a map of the same area for comparison. The oblique aerial photograph was taken from the plane simultaneously with the oscilloscope photograph at the location shown by the circular spot in the radar photograph. Note the effect of perspective.



Miniature tube assemblies, typical of techniques developed to cut down weight and bulk of complicated airborne equipment. Left: Tubes and all circuit components are built into a single compact unit, here mounted on a vacuum tube base. Right: A two-tube multivibrator.

In the earliest radar sets, target range was read from a simple cathode-ray tube, on the screen of which was traced a large inverted V , representing the transmitted pulse, and a smaller inverted v , representing the received echo. The distance between these inverted V 's was a measure of the target range. For convenience, the face of the cathode-ray tube was calibrated in range units. The bearing of a target whose echo was being displayed was read — when the target signal was a maximum — from an angular scale attached to the antenna. The range and bearing of each target were then plotted by hand, and when the radar beam had made a complete sweep about the horizon, all targets in its field of view had been plotted. This clumsy arrangement was soon replaced by what is called the plan position indicator, a cathode-ray tube so arranged that it does automatic plotting of targets. The plan position indicator thus draws a small, true-scale radar map of the surroundings. Elimination of all effects of perspective is one of the biggest advantages of this type of radar as compared with the eye.

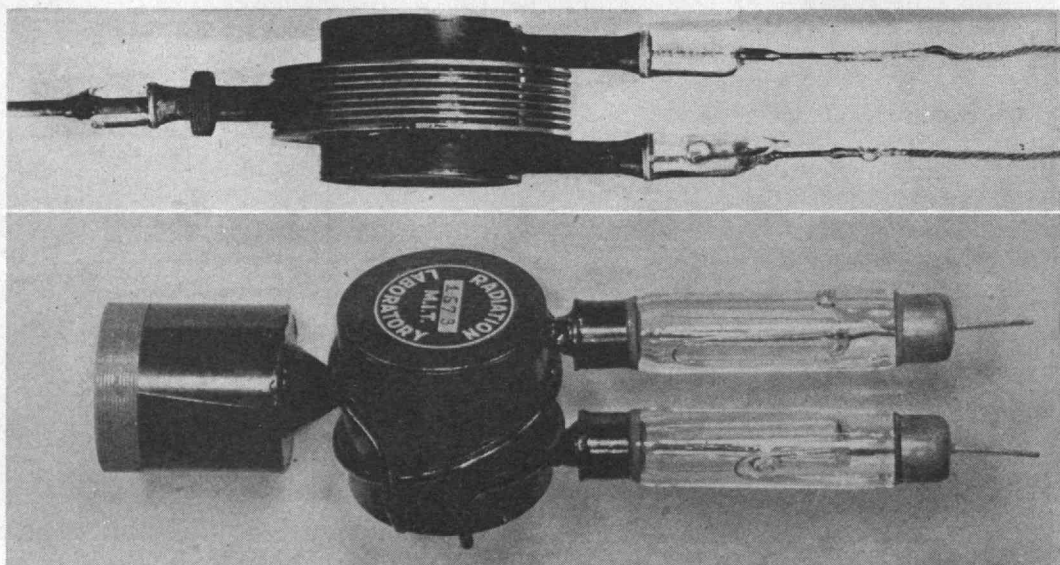
Needless to say, many different developments were necessary before the plan position indicator and its related map-like displays reached their present usefulness. Circuits for producing cathode-ray

tube images and the tubes themselves have been greatly improved over the pre-war art. Long-persistence phosphors have been developed so that the maps drawn by radar will not fade away as they are being drawn. Means for projecting cathode-ray tube displays on a large screen have been worked out, and these techniques will make their contribution to postwar television. Even before the war, the use of cathode-ray tube methods of displaying and recording scientific data was widespread; now we can look to this as the principal recording and measuring tool in scientific and engineering research. Schemes have been worked out for the simultaneous showing of several functions on a single cathode-ray tube using the intensity-modulation techniques so common in radar.

One of the important properties of a radar system is its ability to resolve two targets which are close together. In this property, radar is

usually greatly surpassed by the eye, at least for near-by targets. Resolution in range of two targets, of course, requires only that the duration of the pulse sent out be less than the time required for radio signals to travel the distance between the objects to be distinguished. Pulses ordinarily used have a duration of about one microsecond, so that individual objects whose ranges differ by a few hundred yards are seen as separated. To distinguish as separate objects two targets at the same range but at slightly different bearing angles, the angular width of the beam radiated from the rotating or oscillating transmitting antenna must be less than the angular separation between the two targets as seen at the radar station.

(Continued on page 62)



Comparison between the British magnetron as first brought to this country in, 1940 (above) and a modern high-power 10-centimeter magnetron (below). Despite general similarity in appearance, the newer tube has hundreds of times greater peak power output and much higher efficiency as a result of detailed design improvements.

Primitive Medicine

Curative Practices of Isolated Civilizations Are Not Without Their Links to Modern Medical Science

BY M. F. ASHLEY MONTAGU

WITH the conclusion of the fighting aspect of the war, we have now adequate opportunity to evaluate the magnificent task which our gallant allied fighting forces have accomplished in caring for their men on many fronts. Working with the most advanced techniques and materials, the Medical Corps men present the most dramatic of contrasts to the medicine men of New Guinea, the Pacific islands, and Burma. Yet similarities exist, for the modern doctor with all his remedies, methods, and instruments is in fact a direct descendant of the primitive medicine man. Wherever our Medical Corps men met them the natives were afforded the full benefits of modern medicine and surgery. Although they doubtless have great respect for the white man's medicine, it is more than likely that they consider many of their own medical practices superior to ours. At any rate, it will be of interest to inquire into the medical beliefs and practices of some of these native peoples and to see whether any of the links between the medicine man and the modern doctor are still to be recognized.

Any discussion of so-called "primitive medicine" must begin with a clarification. When we speak of primitive medicine it should be understood that we are speaking of a body of traditional knowledge which is undeveloped compared with our own. It is undeveloped because the people whose knowledge it is have simply never experienced the kind of culturalizing conditions which have fallen to the lot of man living in the Western World. So-called "primitive man" has not developed as complex a culture as we have because he has been completely isolated from the main stream and cross currents of cultural interchange and development to which man in the Western World has been exposed. Any reference to the medicine or culture of isolated man — a phrase in many ways to be preferred to primitive man — in terms of inferiority to our "superior" selves is to be deprecated. For the same reason that we would not think ourselves finer human beings than some of our fellow citizens who have never enjoyed the opportunity to learn to read and write, we should not look down upon those who have never been granted the opportunities which have been ours.

A time-honored and perennial error of which we must dispose here is that medicine and science grew out of magic — magic being defined as the process of manipulating the supernatural, of procuring the supernatural to do our bidding by the performance of certain ritual acts. It is enough to remark here that a close study of conditions

as we find them among existing isolated peoples reveals something quite different, namely, that science and magic are frequently pursued as parallel activities quite independently of each other. For example, when a limb is broken it is set in accordance with the best available empirical knowledge which the individual as a member of the tribe has been able to obtain; there is no magic or ritual involved in the treatment of the injured limb. When a person has suffered from severe and prolonged headaches his skull may be trephined, and if he doesn't get better it is trephined until he does — or dies. No magic is involved in that either. In short, isolated peoples have their rational medicine as well as magical medicine. Experience has taught them that certain plants have medicinal value; they are therefore rationally used. This is not to say that magic and medicine or science are always unrelated to one another; they are very frequently related, and it is often quite impossible to separate one from the other. But it is to say that persons who are members of isolated societies are by no means fools and that they do not live under the unrelieved domination of a host of magical ideas and practices. Nor are they, as some writers have suggested, characterized by a prelogical type of thought. If anything, they suffer from an excess of logic rather than from a deficiency of it. It should be remembered that such drugs as quinine, curare, opium, and digitalis, to name but a few, were all discovered as



U. S. Army Signal Corps

Temperature and heart beat, capable of observation in isolated regions, are put on a quantitative basis in modern medicine.

specifics for certain conditions by isolated peoples and that in such practical phases of medicine as surgery many serious operations have, from the earliest times, been performed upon human beings with complete success. Fractures of every sort have been repaired, dislocations corrected, and obstructions removed.

As a basis for comparing scientific medical practices with the medicine of isolated peoples, it is well to recognize three principal causes which are everywhere found to explain disease — natural cause, human agency, and supernatural agency. If the disease is explainable in terms of material agencies, it is attributed to natural causes; but if it is attributable to the action of some human being who has resorted to sorcery, the malady is assigned to a human agency. Finally, if the illness is held to be due to some spiritual or supernatural being, not human but more or less definitely personified, it is ascribed to a supernatural agency.

The three possible causes of disease stated here are those which, among sophisticated and isolated peoples alike, are accepted the world over. The principal difference in the concepts held by peoples of widely differing cultures is that groups with greater educational advantages tend to place more confidence in the natural causation of disease, while isolated peoples tend to place greater faith in the supernatural causes of disease. As everyone is aware, even in our own society there are really very few persons who do not retain some belief in the supernatural causation of disease, nor is it necessary

to point out that the less educated a person is, the more likely he is to place his faith in the supernatural explanation of disease. In many parts of Europe there exist at the present time populations who believe quite as much in the supernatural causation of disease as do the most isolated peoples.

Where a man can discern a situation, his reasoning is generally logical and based on common sense. On the other hand, where the condition with which he is concerned defies such definition, he will tend to accept explanations which are no more explicitly denotable than that with which he is dealing. Now, in most isolated societies it is believed that everything in the world is animated by some spiritual principle or power. This belief is called animism by anthropologists. In animistic societies it is, of course, a simple matter to explain everything of unknown etiology as due to the intervention of spirits which may be either good or evil. Magic consists of compelling these spirits to do our bidding. The manipulation of these spirits for evil purposes is sometimes called black magic, but their employment for good is called white magic. The practice of magic is called sorcery.

Here, at the very outset, we see how intimately related to the character of a culture are the concepts of disease which it holds, for it is obvious that in a sophisticated society, in which the experimental method occupies a prominent place, the doctrine of natural causes will be the one most generally accepted as an explanation of disease. Where the habit of thought associated with the experimental method is wanting and spiritistic beliefs are the dominant ones, the tendency will be to explain disease in terms of the supernatural.

Given the cultural character of a typical isolated society there may be recognized some seven main types of primitive disease concepts. These are sorcery, breach of taboo, disease-object intrusion, spirit intrusion, soul-or-body-loss, dreaming, and independent occurrence.

When disease is believed to be produced by the activities of persons skilled in magic or by the manipulations of human beings who exercise some control over the supernatural, the disease is then said to be produced by sorcery or magic. In isolated societies there are generally a number of magical ritual acts, which may be performed by anyone, to compel the supernatural to produce disease and even death in some other person, whether of one's own or some other tribe. In addition, there is always present a special class of persons, the medicine men, who are particularly skillful in manipulating the supernatural for good or evil. These may be hired at almost any time to bring affliction to one's enemies.

The magic by which these conditions are produced is of two kinds, namely homeopathic or imitative magic and contagious magic. Homeopathic magic assumes that things which resemble each other are the same. An image, for example, is made of one's enemy and then is injured or destroyed, in the belief that just as the image is injured or destroyed so will be the victim. Con-



U. S. Army Signal Corps

Undergoing treatment in this military hospital, Fiji natives find the application of salves and ointments for burns bears a resemblance to some of their own medical techniques.

tagious magic assumes that things which have once been in contact are always in contact; therefore, whatever is done to the one must similarly affect the other. According to this view, a person is never really dissociated from any part of his body or anything which has been in contact with it. Thus, his nail parings, hair, spittle, and clothing are all part of him, so that anyone who obtains possession of these can, at any distance, work his will upon the person of whom they are a part.

In practice, both homeopathic and contagious magic are often combined; or more exactly, while homeopathic magic may be practiced by itself, contagious magic will generally be found to involve an application of the homeopathic principle. Both branches of magic are comprehended under the general name of sympathetic magic, since both assume that things act on each other at a distance through a connecting invisible "ether."

Under such conditions of belief, causation of disease by sorcery is not only brought in to explain illnesses which have no obvious antecedent cause but is also called in to account for maladies in which the natural cause is obvious. Thus, if a man stumbles and bruises himself or falls from a tree and injures himself in some way, the cause is not ascribed to the boulder that was in the way, or to the rotten branch which broke, or to some failure of co-ordination of the victim. Instead, the accident, as we would loosely call it, is attributed to the act of a sorcerer.

Among the Australian aborigines, for instance, as among many other isolated peoples, death is never regarded as due to natural causes but is always ascribed to sorcery. With the assistance of a medicine man, the person responsible for causing the death is then usually discovered and subsequently becomes marked for death.

Since the magical practices of the sorcerer are, to a large extent, part and parcel of the religious system of the group, it will readily be seen that religion and primitive medicine are closely associated with one another — an association which in civilized societies has been attenuated but has never been quite destroyed. With few exceptions, diagnosis, treatment, and prognosis of disease are all made by the medicine man, and when he is able to discover the cause, as he usually is, he can generally neutralize the effects of the maleficent spirits by some countermagic. Where the disease object is capable of being abstracted directly from the victim's body, that is a simple matter for an expert medicine man. It is only in certain cases of breach of taboo that he, or anyone else, can do nothing.

Taboo (originally a Polynesian word) may be defined as a prohibition, the infringement of which automatically brings about its own punishment. Certain things are regarded as in themselves so dangerous that to break the taboo in connection with them automatically results in punishment without the mediation of supernatural or human forces. The occult power residing in an object mystically dangerous is transmissible and is therefore capable of affecting whatever comes into contact with it. That contact which most frequently automatically releases the occult punishing power is bodily contact. In many parts of Africa it is forbidden to touch anything from which the king or chief has eaten, be it the food or the plate from which the food was eaten. Anyone who wittingly or unwittingly breaks this taboo is inescapably doomed to die, usually within from a few days to a few weeks. So powerful is the force of suggestion that the native who has broken the taboo often wastes away.

As Webster¹ says, "The authority of a taboo is unmatched by that of any other prohibition. There is no reflection on it, no reasoning about it, no discussion of it. A taboo amounts simply to an imperative thou-shalt-not in the presence of the danger apprehended. That any breach of the prohibition was unintentional or well-intentioned matters nothing; no allowance is made for either the ignorance or the praiseworthy purpose of the taboo-breaker."

Where sickness is believed to be produced by the breach of some taboo, expiation of the offense may sometimes be made with the assistance of a medicine man who, by the performance of certain magical acts, may succeed in releasing the victim from the effects of his transgression.

In isolated societies it is a widespread belief that many types of illness are caused by the entrance into the body of some foreign object. Such morbid objects may find their way into the body either by direct human agency or by the action of some nonhuman agent. The disease object is usually regarded as carrying a spiritual essence, which is the real cause of the illness. Under such conditions it becomes the function of the medicine man to extract the disease-producing object from the victim's body. The disease object may take almost any form, and it is always very small — a pebble, a splinter of wood, bone, hair, an insect, a lizard, or a worm. Removal of the object is usually accompanied by sucking upon some part of the body, and sure enough, in a very short time the medicine man produces the pathogenic object from his mouth. This has, of course, been secreted there by the medicine man for production at the appropriate time, in much the same way as many a modern physician, called upon to deal with an hysterical patient who mistakenly believes that a fishbone has lodged in his throat, produces a fishbone which was never there. In either case, the patient leaves perfectly happy in the knowledge that he will be troubled no longer. Since, in many cases, the illness was originally produced by suggestion, the sight of the object which is believed to have been the immediate cause of the disease is sufficient to work a cure.

When it is believed that disease is due to the presence in the body of some immaterial agent, such as a spirit, a ghost, or a demon, we may speak of disease by spirit intrusion. Spirit intrusion must be carefully distinguished from possession, the latter being the belief that a person has been entered by a supernatural being who then speaks through his host. Such a person is not regarded as ill in the ordinary sense of the word. His insanity is, on the contrary, regarded as evidence that he has been honored by a supernatural being who has taken up his abode within the affected person's body. Such a person is therefore respected as a holy one and is often consulted as an oracle.

There are three methods commonly used to eject the intrusive spirit from the victim's body: exorcism, mechanical extraction, and transference. In exorcism, the evil spirit is ejected by conjuration. The spirit is removed by manipulative, surgical, or similar means in mechanical extraction. Transference refers to the transfer of the disease object from the victim's body to some other object. Exorcism is almost always practiced together with one or both of the other methods.

Abstraction of the soul, or a part of it, or some part of the body are still other modes in which disease is be-

¹Hutton Webster, *Taboo* (Stanford University Press, 1942), p. 17.

lieved to be produced. Among the Australian aborigines the abstraction of the kidney fat, or possibly more correctly of the greater omentum (the apron of tissue lying over the intestines), is held to be a common cause of disease. It may be removed by sorcery as a punishment for the infringement, knowingly or unknowingly, of some rule and thus terminate in the death of the victim. Still more widespread is the belief in soul abstraction as a cause of disease and often of death. The soul may be abstracted by ghosts or sorcerers, or during sleep the soul may leave the body (as it is frequently believed to do in dreams) and meet with some accident on its nocturnal wanderings which prevents its return. The task of the medicine man here is to discover the whereabouts of the missing soul by divination or other means and then return it into the body of his patient.

Dreams may be the cause of sickness. In the Pacific and southwestern areas of North America, one may dream of eating poisoned foods or that an animal has entered one's body and then wake up ill or become ill.

Minor ailments such as leg sores, cuts, scratches, and a host of other common minor conditions are regarded as arising independently of any action on the part of human beings or of higher powers. It is when a disease appears to threaten life that people begin to think of human or spiritual agencies. Attracting little attention, minor ailments do not afford material for speculation. But such minor ailments do not necessarily fall into the domain of what we should call natural causation. Since they are unimportant no one thinks enough of them to attribute them to any cause, and since they do not require any appeal to magical or spiritual agencies for cure they are treated with domestic remedies.

From this presentation of the concepts of disease held by isolated peoples it will be seen that their medicine represents a perfectly rational system. Their medical practices are a most logical consequence of the spiritistic beliefs which such peoples hold. Their ideas of causation may be wrong from our standpoint or they may contain a grain of truth here and there, but given certain spiritistic concepts, the body of medical practice follows with a degree of consistency which we can some day only hope to equal. In short, it should be clear that, in his view of the nature of disease and its treatment, isolated man is no illogical unreasoning creature. He is, in fact, a thinker who, with the data at his disposal, does at least as well as we would do under similar circumstances. Let us, then, look upon him with that respect and understanding which are his due.

A brief account of some of the more practical devices to which isolated man resorts in various parts of the world will help to convey some idea of his ingenuity and the closeness, even identity, of many of his practices to our own of the present day.

Among the Ashanti of West Africa, inoculation for smallpox or against snakebite is successfully undertaken. In smallpox the contents of a pustule are rubbed into an incision made in the skin. In the treatment for snakebite the procedure is almost identical with the most recent methods devised by ourselves. Veins are punctured by the use of splinters of stone or bone or by the use of a little arrow, which is shot into the vein from a miniature bow. Cupping and bloodletting are very widely practiced, cupping usually being done by powerful suction with the mouth through a bone tube or similar instrument. Drain-

age from wounds is sometimes secured by means of sections of bamboo. Foreign bodies are extracted and abscesses opened with thorns or other sharp-pointed instruments.

Suture or tight bandaging, in order to promote union, is not unknown among some tribes. Stitching of small wounds is carried out by means of thorns. A very original method of suturing a wound is practiced among certain Indian tribes of Brazil. Both edges of the wound are allowed to be seized and brought together by the sharp head-nippers of certain ants, whose bodies are then rapidly cut off; one ant after another is used until the wound is closed.

Ulcers are frequently treated by cauterization with hot ashes or with heated blades and irons. In the treatment of fractured bones, splints and occasionally casts made of clay are often used. On the whole, the results obtained by the native bonesetters are said to be extremely good. Trephining of the skull has already been mentioned. At all times a serious operation, this is very skillfully performed by the native surgeon with a blade of stone or glass. There are skulls in museum collections which show that persons often have been operated upon in this manner as many as four and sometimes five times. Evidence of healing around the bone edges shows that there has been good recovery in these cases.

Medicines are given in the form of decoctions, poultices, embrocations, salves, and infusions of various sorts. Hydrotherapy, dietetics, and massage are widely practiced. Enemas are administered by means of primitive appliances, and fumigations, inhalations, snuffs, nasal douching, and instillations are also more or less widely practiced. This list of medical practices could be very widely extended, but sufficient has been said, it is hoped, to indicate that the medical resourcefulness of isolated man is scarcely less than our own.

A few words may be added concerning the medicine man. How does a person become a medicine man? The pattern varies with different peoples. In some tribes the position is hereditary; in others the addiction to epileptiform states is the best qualification, or a man may come to be recognized as possessing a special gift for setting broken bones. In still other tribes the would-be medicine man must undergo a special course of training, and there are even distinct grades of medicine men in certain societies as, for example, among the central Australian aborigines. Here the three grades of medicine men are those who are made by the spirits, those who are made by a special class of mischievous spirits, and those who are initiated by other medicine men. The first two grades are more highly regarded than the third. In each case the man himself feels that he is especially capable of becoming a medicine man. Women may become medicine women in the same manner. Almost everywhere women are the midwives and child-doctors (pediatricians).

Among our own American Indians one may become a medicine man in a variety of different ways. Among the central Algonquian peoples, for example, there exists a secret society known as the Midéwiwin. This society is the repository of most of the medical knowledge of the tribe — a sort of college of physicians — into which one may gain entry by apprenticeship in early youth or by payment of the necessary fees and acquisition of the proper knowledge at any later time. It is a great honor to be a graduate of the Midéwiwin. (*Concluded on page 56*)

Educated Machinery

Mechanized Mathematics Relegates to the Machine the Drudgery of Computation and Liberates Man's Thinking for Creative Effort

BY SAMUEL H. CALDWELL

FROM early times man has devised mechanical aids of one sort or another to assist him with even the simplest of his mathematical problems. The ancient abacus, still in use in some parts of the world, has given way to the calculating machines found in every modern office; and every engineer is familiar with the use of the slide rule. Mechanical aids to computation have served to minimize errors, to be sure, but their main purpose has been to effect economy of time and effort and to remove some of the limitations on man's productivity.

Three years ago a new calculating machine was placed in service at M.I.T. Almost without notice it began performing its assigned war duties as part of the equipment of the Institute's Center of Analysis. Last month the new differential analyzer emerged from the obscurity of war for its first public demonstration.

This 100-ton giant contains about 2,000 electronic tubes, several thousand relays, and about 150 motors, and nearly 200 miles of wire were used in its construction. It is evident that no adequate description of such a calculating device can be given in a reasonably short article, particularly in view of its exploits in the realm of higher mathematics, but a technical paper on the new machine and its method of operation is now available.¹ It will be the object of this discussion to indicate the general principles on which the use of the differential analyzer is based, to explain how and why the new machine differs from the earlier type, and to show how it contributes to the Institute's program of teaching, research, and service to government and industry.

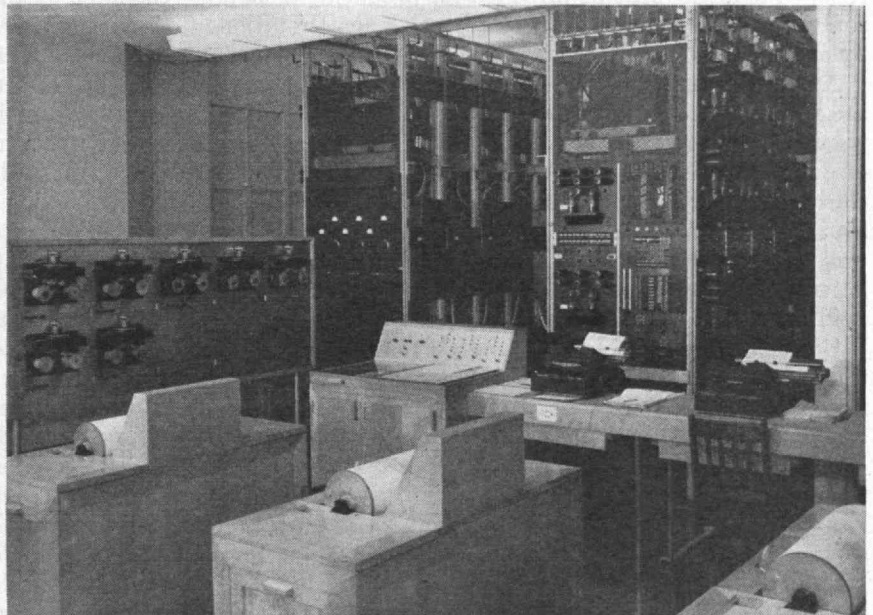
In the research activities of the Institute the differential analyzer has been most conspicuously effective, and the new machine holds even greater promise for the future. The early work done on the machine reflected the research interests of the Department of Electrical Engineering in which it was developed, but opportunities for service in other fields of science and engineering quickly appeared. A partial list of the fields of application includes studies of transients in electric circuits, particularly circuits containing non-linear elements, studies of transients in electric machinery, the computation of atomic-wave functions, the analysis of vibrating mechanical systems, studies of geophysical exploration techniques, seismographic analysis, and studies of

acoustic waves. Substantially all the trajectory computations needed in the theoretical studies of cosmic rays were carried out on the differential analyzer. The principal war task of the machine was the solution of the differential equations of ballistics; the machines at the Institute worked continuously on that assignment, much of the time on a day-and-night basis.

The differential analyzer is used principally to evaluate the solutions of ordinary differential equations. These solutions may be produced either graphically or numerically, or in both forms. A graphical solution consists of a curve, drawn automatically by the machine, showing the relation between any two variables appearing in the differential equation. A numerical solution consists of a printed table of the corresponding values of the variables at any convenient intervals. Actually, the recording system of the new differential analyzer can print a table of the simultaneous numerical values of a maximum of 10 variables if required to do so.

Within the machine, the variables of a problem are represented on the shafts of a variety of mathematical units. The rotations of these shafts represent, after known scale factors are applied, the changes in the values of the variables of the problem. The rotational speeds of the shafts have no significance; we are concerned only with the angular displacements of the shafts relative to each other.

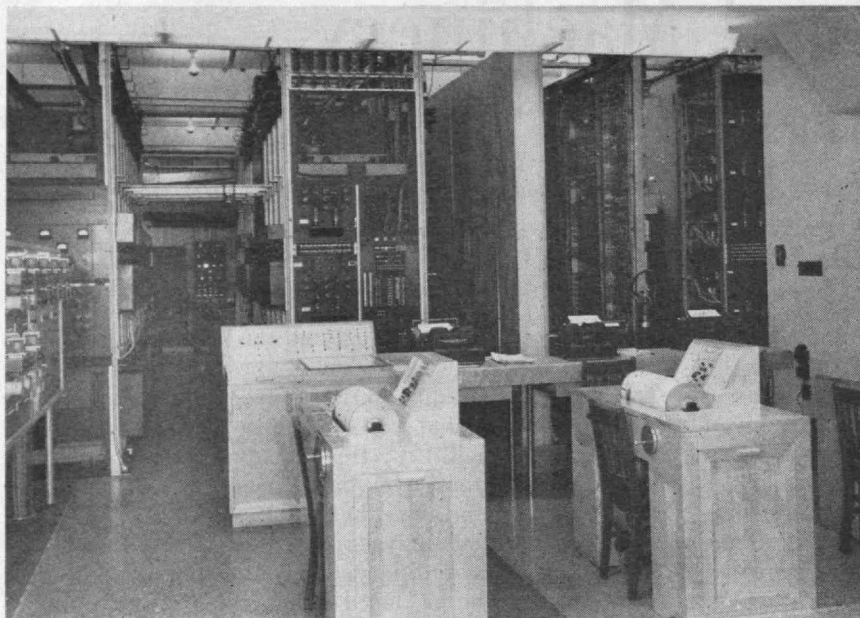
Physically, the important elements of a differential



M. I. T. Photo

General view of the differential analyzer. The three input tables are in the foreground. Tape-reading units for setting up the analyzer from tapes are at the extreme left. Beyond the input tables are the main control station and two of the three automatic typewriters. To the rear are two bays containing groups of mathematical units and control equipment.

¹ V. Bush and S. H. Caldwell, "A New Type of Differential Analyzer," *Journal of the Franklin Institute*, October, 1945, pp. 255-327.



M. I. T. Photo

Another general view of the differential analyzer showing more clearly the distribution of equipment. Beyond the typewriters are (from right to left) racks supporting the recording counters, the counter computing relay groups, and the main controls and switching relays.

analyzer are: a group of mechanisms for performing the basic mathematical operations required; a system for interconnecting the shafts of the mathematical units so that the operations demanded by the differential equation are performed and the equality expressed by the equation is satisfied; and a system for measuring and recording the rotations of those shafts which represent the variables needed in the final result.

Only a few types of basic mathematical units are used, but a relatively large number of identical units of each type are provided. These units must be able to perform on variables represented by rotating shafts the operations of addition, subtraction, multiplication, division, and the integration of any variable with respect to any variable. Also, equipment must be provided for producing a shaft rotation which can be related to any other shaft rotation by a specified function.

A simple example will serve to show how these elements are used. Consider the case of a body freely falling in a vacuum from an initial position at rest. The acceleration of gravity produces a velocity proportional to time, and the distance through which the body falls increases as the square of the time. So far, the solution of the problem is well known, and no differential analyzer is needed to determine it. But, nevertheless, we shall use one at this point in order to prepare for the next step.

One shaft in the machine is assigned to represent time, the independent variable of the problem. This shaft does not have to rotate at constant speed; it is merely necessary that a scale be assigned such that a definite motion—for example, 100 revolutions of the shaft—always represents one second of time.

Another shaft is assigned to represent the acceleration of gravity, again to a suitable scale. This shaft has very little to do for the moment and needs only to be given an initial displacement corresponding to 32.2 feet per second per second.

These two shafts are connected to an integrator, which we will designate as Integrator I, so that the constant acceleration is integrated with respect to time. The output

rotation of Integrator I then represents the velocity of the body, starting from zero and increasing in proportion to time. If the output shaft of Integrator I and the shaft representing time are connected to a second integrator, Integrator II, we can integrate the velocity of the body with respect to time. The output shaft of Integrator II then represents the distance the body has dropped from its starting point.

In actually setting up this problem we would first make all the shaft connections described and then start the motor on the independent variable shaft which here represents time. Then at uniform intervals of the motion of the "time" shaft, recording equipment would be actuated so as to measure and record the instantaneous values of the velocity and the distance through which the body has dropped, as represented by the outputs of Integrators I and II, respectively.

Now suppose the problem involves the same body falling in an atmosphere which exerts a retarding force proportional, say, to the square of the velocity. To take this force into account we must use another type of mathematical unit available which can produce a functional relation between the motions of two shafts, in this case a square-law or parabolic relation. We observe above that the output of Integrator I is the velocity of the body. Suppose we connect that output shaft so that it rotates the input shaft of the function unit. We can thereby obtain from the function unit an output motion which represents the square of the velocity and hence is proportional to the retardation force of the air acting on the body. A simple gear ratio can then be used to represent the process of dividing the force by the mass of the body to obtain the acceleration due to air friction.

Now we recall that one of the inputs to Integrator I was the acceleration of the body. If, instead of the constant acceleration of gravity, we supply to this integrator a shaft motion which represents the difference between the downward-acting acceleration of gravity and the upward-acting acceleration of air friction, the machine will be ready to solve the more difficult problem. Since one of the acceleration components is constant and the other is initially zero, the required effect is here secured by connecting the shaft which represents the acceleration due to air friction directly to Integrator I, in a negative sense, having already introduced at that point an initial rotation in the positive direction representing the gravity component of acceleration.

We can extend the problem still further and study the effect of the variable density of the atmosphere on the motion of the body. Since the output of Integrator II represents the distance the body has moved, its distance above the earth's surface is represented by the same shaft motion, interpreted in the negative sense and measured with respect to the position for zero altitude. Hence, the output motion of Integrator II can be connected to another function unit arranged to produce an output motion representing the change of air density with altitude. The

output shaft of this function unit and that of the unit producing the function of velocity are connected to a multiplier, and the product is the force of air friction modified to account for the variation of air density.

There is no need to restrict the form of the air retardation function to the square law originally assumed. Actually we would use whatever function represented the measured air friction force acting on the body. Likewise, we need not assume that the acceleration of gravity is constant. Its variation can be taken into account by using another function unit driven by the output of Integrator II. The output of this function unit would be combined with the air friction component of acceleration to produce the final acceleration term required by Integrator I.

Although the above example is by no means illustrative of the full scope of the differential analyzer's power, it is fully representative of its basic method of use. In order to solve the differential equation of the motion of a falling body, we construct on the differential analyzer a physical system which is governed by that differential equation and then measure and record the behavior of the substitute system. In everyday operation, however, we do not assemble the machine by the process of physical reasoning used in the example. Instead, we work directly from the differential equation, interpreting it as a set of mathematical directions which we follow in assigning tasks to the individual units of the machine and in establishing the flow of shaft motion throughout the interconnecting system.

The complete method is now summarized by two principles which enable us to use a differential analyzer to handle any ordinary differential equation: (1) By use of a few types of mathematical units, shaft rotations can be produced to represent each term in the equation. (2) The individual mathematical units can be interconnected so that the grouping of terms and the equality among the terms demanded by the equation are satisfied.

The most important type of unit in the machine is the integrator. Although its mathematical job is to perform integration, it can be used in combinations which produce products and quotients and in a large variety of combinations which generate functional relationships without the need for plotted curves or cams. Its versatility is astonishing, particularly in view of the simplicity of the device

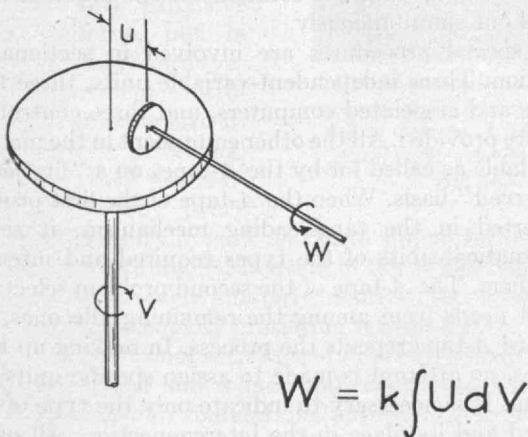
itself. Essentially, the integrator consists of a flat disc of metal or glass which can rotate about a vertical axis, a sharp-edged wheel resting on the disc and driven by contact friction so as to rotate about a horizontal axis, and a displacing system driven by a lead screw so as to vary the distance between the edge of the wheel and the center of the disc. A shaft rotation U representing the integrand is supplied to the lead screw, and another shaft rotation V representing the variable of integration is supplied to the disc. The rotation W of the wheel shaft is the useful output of the integrator and it represents the integral given in the perspective diagram of the integrator.

Addition and subtraction of variables is accomplished by the use of differential gears, commonly called adders, which are the same in principle as the gears in the rear end of an automobile. In the new differential analyzer, adders are provided in combination with groups of spur gears, needed for the introduction of parameters and for scale changing. The spur gears are arranged in two types of decimal "gear boxes." A one-digit box can be set to any ratio from 0.1 to 1.0 in steps of 0.1, and a decimal box can be set to any ratio from 0.0000 to 1.1110 in steps of 0.0001. Magnetic gear shifting is used so that these ratios can be established from a central operating point.

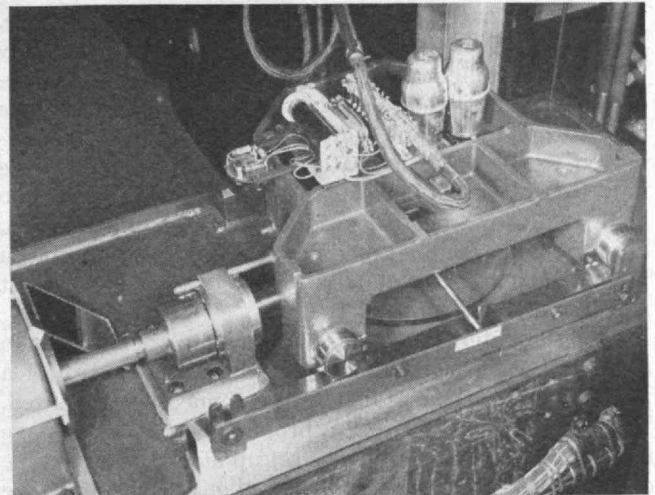
At present, functions which cannot be generated by integrator combinations are introduced by the use of a manual function unit. A large-scale plot of the required function is wrapped around a cylinder so that the axis of abscissae lies along a circumference. The shaft motion which represents the argument of the function is used to rotate the cylinder. An operator turns a crank which moves a "bull's-eye" index in the ordinate direction, and by keeping this index continuously on the plotted curve the operator produces a shaft motion which represents the function described by the curve.

Considerable progress has been made in the development and construction of an automatic unit which will generate functions from a numerical tabulation of ordinate values and a set of differences of these values. Unfortunately, this work was greatly retarded by war demands and could not be completed in time for use in initial operations of the differential analyzer.

In all of the differential analyzers previously built, the second principle stated above is implemented by means of



Perspective drawing illustrating the simplicity of the wheel and disc for carrying out integration by mechanical methods. At the right is shown an integrator as used in the differential analyzer. A



rolling carriage supports the wheel (not visible) and electrical equipment for transmitting the electrical representation of its motion. Beneath the carriage can be seen a sector of the disc of the integrator.



M. I. T. Photo

Special tape punch used for preparing the A-, B-, and C-tapes. These tapes control the interconnections of the machine as called for by the equation to be solved, establish the proper scale factors, and adjust the analyzer for the correct initial conditions, respectively.

a mechanical "switchboard" through which the connections required by the equation are established. Standard sections of shafts, couplings, and gears are provided, and these, in conjunction with a system of bearings, are assembled so that each unit receives and transmits its input and output motions, respectively, over direct shaft and gear connections. Because of the relatively large mechanical loads which must be driven, torque amplifiers are required at the outputs of the integrators.

An outstanding feature of the new differential analyzer is its interconnecting system, designed to effect major improvement in the flexibility and speed of assembly and thereby to extend the serviceableness of the machine to a much larger group, especially those located at a distance.

All connections among the units are now made by means of servomechanisms. Every shaft carries a variable-capacitor device known as an angle indicator.² The angle indicator on an output shaft of a unit is electrically connected to the angle indicator on the input shaft of the unit to which motion is to be transmitted. These two angle indicators together produce a signal voltage which, after amplification and modification, controls a motor on the input shaft so that it is forced to repeat the shaft motion being transmitted.

All of the interconnections of a problem are made on an automatic electrical switchboard under the control of a paper tape punched to denote the connections required. The process is so fast that a problem which would have required one or two days to be set up on the original type of differential analyzer can be placed on the new machine in a few minutes.

² Similar functionally to the well-known "Selsyn" electromagnetic angle indicator.

In addition to the punched tape used to establish the connections of a problem, another tape sets up the gear ratios required, and a third tape transmits the initial conditions for each solution to the appropriate mathematical units. These tapes are designated as the A-, B-, and C-tapes, respectively.

Some mention has already been made of the recording system. This system consists of a group of counters, computing and storage relays, and electric typewriters. The counter shafts are driven by standard servomechanisms and are connected so as to repeat the motions of unit shafts representing the variables which are wanted in the final result. By a system of tubes and contacts each counter transforms its shaft motion into a number which measures the instantaneous position of the shaft to the nearest tenth of a revolution. Usually, readings are made at uniform intervals of the motion of the machine shaft which represents the independent variable of the differential equation. When a reading point is reached, all the counters used in the problem are actuated by a common signal. The numbers corresponding to the instantaneous shaft positions are read and stored by the counter. Each counter in turn then delivers its reading to a computing network where corrections are applied for initial values, and the final results are used to operate the solenoids on the recording typewriter.

Some comparisons have been given in the above discussion between the new differential analyzer and the earlier type. Both machines operate on the same fundamental principles, and their essential computing mechanisms are the same. One objective of the new design was to improve precision. This has been done to the extent that the new machine now delivers results to within about one part in 10,000 whereas the old machine operated to within four to 10 parts in 10,000.

The capacity of the new differential analyzer is expressed by the fact that it has 18 integrators available — three times the number of integrators in the first model and four more than are available in the next largest machine in use. This capacity is necessary to handle the most complicated problems but it is not needed for many problems. For this reason the machine has been designed so that it can operate in one, two, or three independent sections, with each section accommodating a separate problem or with multiple solutions of one problem being carried out simultaneously.

No special procedures are involved in sectionalized operation. Three independent-variable units, three typewriters and associated computers, and three control stations are provided. All the other equipment in the machine is available as called for by the A-tapes on a "first come, first served" basis. When the A-tape of the first problem is inserted in the tape-reading mechanism, it selects mathematical units of the types required and interconnects them. The A-tape of the second problem selects the units it needs from among the remaining idle ones, and the third A-tape repeats the process. In making up these A-tapes, no attempt is made to assign specific units to a problem. It is necessary to indicate only the type of unit required and its place in the interconnection. All of the selection and assignment of units is carried out automatically. Where gear boxes are indicated on the A-tape, the control mechanism selects the simplest type which will do the work required, and if none of these are available it will automatically (*Continued on page 58*)

How Beavers Build

Conservational Value of Their Lodges and Dams Greatly Outweighs the Destruction Wrought by Engineers of the Animal Kingdom

BY FREDERIC W. NORDSIEK

AT times apparently applying the principles of engineering with great ingenuity, on other occasions the beaver does its constructing in singularly inept ways. The beaver is an efficient operating unit, for its principal building material is also its main food. Immediate effect of beaver tenancy is distressing destruction of trees, but long-term results of this animal's activity have great conservational value. Paradoxes such as these enliven any study of *Castor canadensis*, the American beaver.

Although beavers were at one time swept from most of the United States by excessive trapping and destruction of forests, their dams and lodges may now again be found in many places, for wherever reintroduced into suitable woodlands and protected against indiscriminate trapping, beavers have prospered and made a vigorous comeback. The animal itself is rarely seen, however, because even under protection it usually remains extremely shy. Furthermore, as a rule its activities are strictly nocturnal.

Most of the observations on which this article is based and the photographs illustrating it were made in the Harriman State Park, which is so near New York City that the tops of the park's Ramapo Mountains command a clear view of the city's skyscrapers. Beavers originally disappeared more than a century ago from the area now occupied by this extensive forest preserve, but in 1920 the state conservation department introduced six animals into it. These beavers thrived and multiplied; their descendants now occupy every watershed within the park and have spread far into surrounding private woods. Beavers in the White Mountain National Forest were similarly reintroduced after early extinction, with equally gratifying restoration.

The constructional activities of beavers are multiform; they build dams and lodges and dig canals. They use stones sparingly in foundations and pile earth on their structures, but their main building material is branches of trees. The bark of certain trees is their food, and when building with branches of species whose bark they relish, such as poplar and cottonwood, they combine feeding with constructive activity by eating the bark from each branch before placing it.

That beavers cannot control direction of fall of trees they bring down is obvious from the kerf they cut. This kerf is tapered uniformly all around, as one would sharpen a pencil. This is in striking contrast to the lumberjack's wedge-shaped kerf, which forms a hinge to throw trees in the desired direction. A result of this uncontrolled fall of beaver-cut trees is that many of them are what the lumberman calls "hung," that is, caught in the branches of nearby standing trees, so that they do not reach the ground but remain inaccessible to the beaver. Those studying beaver activity must be constantly on guard against such hung trunks, for a gust of wind or the rotting of a branch occasionally sends one crashing unexpectedly to the ground.

Beavers are wasteful wood gatherers. They cannot readily move branches much thicker than a man's forearm, yet they regularly cut down large trees; at a camp on Lake Stahahe, in the Ramapo Mountains, a beaver stump with a diameter exceeding 20 inches may be seen.



Beavers are wasteful wood gatherers. They cut down all of this clump of five basket oaks but dragged only two of the saplings off to their pond. However, such scars of beaver activity heal quickly after colonies migrate, and beaver occupancy in the long run helps to conserve any woodland area.

Having felled a big tree, beavers often remove from the prostrate crown branches of sizes they can handle, and if the tree is of a kind whose bark they like, they sometimes eat bark from the main trunk, biting along in neat rows much as a man would consume an ear of corn. But at times beavers cut down trees for no apparent purpose, leaving the fallen trunks untouched. This usually happens when they come upon a stand of one of their favorite food trees. Then nearly every tree of this kind may be felled, even though bark and branches

of but a few are used. Evergreens, the bark of which beavers do not eat, are seldom felled by them.

Another wasteful habit of beavers lies in their practice with trees growing in clumps, such as white birches and basket oaks. The animals invariably cut down all of such a clump and yet usually carry off no more than one or two of the trees. Beavers also kill standing trees by girdling and through flooding of roots when dams raise the level of water bodies.

But the destructive results of beaver activity are transitory, for scars left on woodlands by beaver tenants quickly heal after colonies move on, as they do in time. Furthermore, beaver dams have great conservational



Beaver dams are durable. This old one has been abandoned for three years; its age is shown by its seven-foot height and by the facts that it is cluttered with leaves, that grass has grown thickly on the earth piled on it by the builders, and that the trees it has killed are rotten with fungi. Yet this dam easily holds the April freshet behind it.

value, because they reduce erosion by slowing down the runoff after rainfall, hold a reserve of water in the uplands for plants and animals there, and release this precious moisture slowly to farmers' fields in valleys below, thus protecting crops against both flood and drought. Beaver ponds also act as settling basins, allowing freshets to drop their burden of alluvial silt, so that this fertile soil is retained in the uplands instead of being carried down to clog irrigation canals or navigable waterways. Finally, beaver ponds serve as breeding places for fishes and waterfowl and supply homes to that valuable animal, the muskrat.

The beaver's lodge is used mainly in winter, when it is a refuge. Its underwater entrance makes possible ready access to the pond bottom nearby, where stores of branches provide a winter-long food supply of bark. This winter-time function of lodges explains why beavers build dams, for water around the lodge must be deep enough not to freeze to the bottom. When sufficient depth of water is assured by other means, beavers may omit dam building. For example, I have found beaver lodges in abandoned magnetite iron ore mines in the Harriman Park. When these mines were worked, most recently during the days of our Civil War, they were kept dry by pumping, but after abandonment they filled with ground water. Beavers find excellent lodge sites in these flooded mine pits but while dwelling there have no occasion to build dams.

Totally different circumstances gave rise to a colony of damless beaver which I observed at Carter Notch in the White Mountain National Forest. Early one July evening, as I stood beside one of two tiny lakes lying among the jumble of talus boulders in this high pass between Carter Dome and Wildcat Mountain, I was startled by the unmistakable sound of a beaver tail splash. This sound is made every time the animal dives. Often but ineptly described as a slap, it is best likened to the resounding splash of a foot-square rock dropped into water from a considerable height. A moment later, as I scanned the surface of the pond, I saw emerge the conical head of a beaver. The beaver swam about unconcernedly, although I made no attempt to remain motionless or otherwise to conceal my presence. The animal alternated aimless

swimming with occasional dives, apparently equally purposeless.

This individual was departing from instincts of its tribe not only in showing itself in the presence of a human being of whom it was plainly aware but also in appearing before darkness, for the sun had just set. Investigation the next day showed that the colony to which this radical beaver belonged had also deviated from usual behavior patterns by building a lodge hidden in a crevice among huge talus boulders forming the banks of the pond and by doing no dam building whatsoever. To be sure, this little lake is deep, and its outlet is no overt brook but rather a seepage among boulders into a second, lower lake, so that dam building was unnecessary and perhaps was even impossible.

Beavers construct dams by anchoring branches in the mud bottoms of streams or ponds, sometimes using a few stones to secure this foundation and then piling branches, at random, on and among these foundation limbs. Twigs and other irregularities of the branches are knit together by pressure of water behind the structure. Finally, leaves and other debris, floated down by the stream, plug small openings, so that without much intervention by its builder the dam becomes watertight.

Beaver dam building is a haphazard procedure, apparently guided by a strong instinctive behavior pattern which is not supplemented by any true intelligence on the part of the animal. Admittedly, beaver dams are sometimes built where projecting rocks or fingers of land serve to shorten and strengthen them. On the Warwick Turnpike, an abandoned road in private woodlands west of the Harriman Park, is a dam which took similar advantage of a man-made structure. Here beavers first plugged a culvert and then later, when water had risen to the level of the unused road, built their dam on the roadbed. But choice of such advantageous sites is clearly a matter of chance, for equally numerous are dams which avoid desirable sites to use others but a short distance away, where much longer structures are required. Furthermore, dams do not necessarily follow a straight line between two shores but often meander. At other times dams are roughly arc shaped, but if so, they are as apt to arch downstream as they are to show the upstream arch of the man-built masonry dam. (Continued on page 54)



A new beaver dam. Difference in water level here is only about three feet, and newness of the dam is further shown by the facts that interstices are not filled with debris and that flooded trees in the background have not visibly rotted. Beavers ate the bark from most of the branches they used to build this dam.

Face Lifting for Tin Cans

Shorn of Two-thirds of Its Coating, the Common Tin Can Benefits From Developments to Conserve Critical War Materials and Emerges Improved for Peacetime Use

BY J. C. WHETZEL

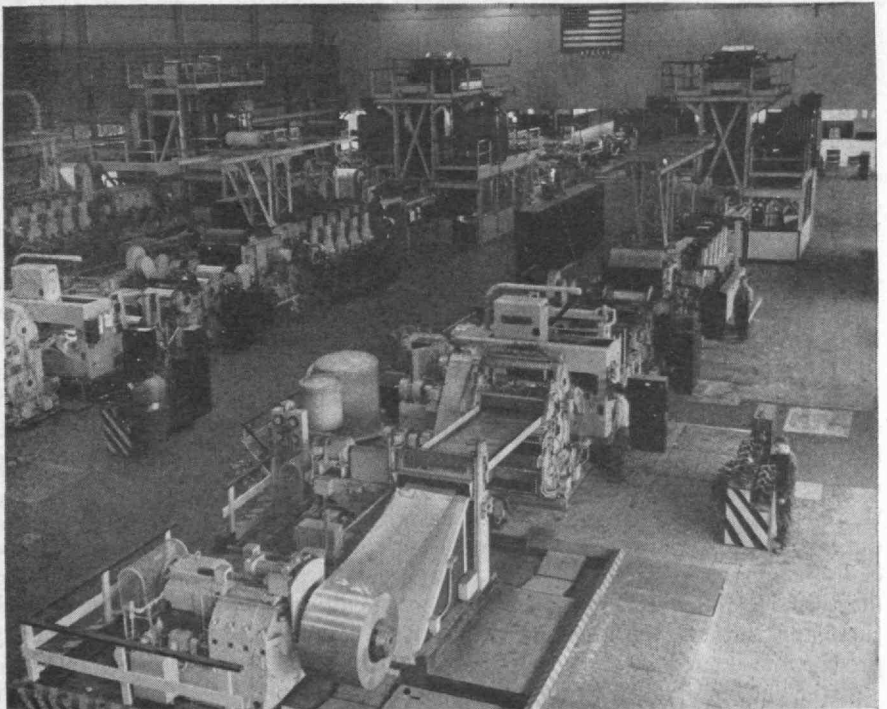
TIN PLATE, prime material for containers and closures to preserve food and other necessities, is an essential in modern life. As a metal for coating steel, tin is unique, for it answers in the most practical way the broad problems of corrosion resistance as they are posed by containers which must be relatively inexpensive but must be capable of service under many conditions. The service life of such utensils depends directly upon their resistance to corrosion, generally in the absence of air or oxygen. In severe applications, the primary protection afforded by tin may be supplemented by the use of other metallic or of organic plastic coatings; tin as the material of first choice, however, has not been threatened by general substitution.

The war had placed makers of tin plate in a dilemma: on the one hand, the demand for tin plate as a weapon delivering food to fighting men and protecting materials increased greatly; on the other, supplies diminished as a result of the loss of Far Eastern tin sources. Each of these factors has fostered the speedy development of plating steel with tin by electrodeposition instead of the older method of dipping the steel sheet in a bath of molten tin. Electrolytic tin plate has stretched the nation's tin reserves and has done so with such efficiency that it is destined for large future expansion when war restrictions are finally and completely lifted.

Production figures and cost of materials offer basis for judgment of the importance of this development. The tin-plate industry is one of the larger consumers of steel, taking from 2,000,000 to 3,000,000 tons annually in pre-war years. Almost 4,000,000 tons of finished steel were converted into tin plate during 1941; in 1944, some 3,000,000 tons were so used, even with war-time restrictions. The price of the tin used in plating has ranged in the last two decades from a low of 20 to a high of about 75 cents a pound. The price had been stabilized by the International Tin Control at approximately 50 cents for several years before the war. Though this level was not without some cost to us, it led to real encouragement of production in higher-cost localities such as Bolivia. New sources of supply were thus brought in to aid the electrolytic process and other conservation methods in meeting requirements during the emergency.

When tin plate is produced through the dipping of light-gauge steel sheets in molten tin — the conventional hot-dipped tin plate — a coating of the order of 0.00009 inch in thickness is regarded as the minimum consistent with good service life and the low cost required for large-volume use. Such a coating spreads a pound and a half of tin over both sides of 218 square feet of steel averaging about 93 pounds in total weight. This area of sheet, known as a "base box," is the conventional unit of measure. In pre-war years a coating of 1.5 pounds per base box was the standard for 99 per cent of tin-plate production. With the loss of Far Eastern tin in prospect, early conservation steps reduced the hot-dipped coating to 1.35 and then to 1.25 pounds per base box. When such coatings as these are sought, limitations in the distribution of the tin and in speed of tinning are encountered. If the coating is reduced below 1 pound per base box, thin spots are likely to be found. Hence the conventional method of hot-dipping steel sheets may well be found inadequate under adverse conditions.

Fortunately for us, the most efficient use and conservation of tin in tin plate had received much attention many years before the present emergency. Continuous strip steel methods for producing black plate — untinned steel —



Line operations in tin coating light-gauge, cold-reduced steel. Sheet steel, uncoiling in foreground, progressively passes through welding, cleaning, electro-tin coating, melting, chemical treating, oiling, and shearing operations.

gave much encouragement to this research and development. The conveying of individual sheets at high speed is a far more difficult operation than the similar handling of a continuous web. But as the speed is multiplied with costly strip equipment, hot dipping in molten tin becomes much more troublesome. The molten metal is pumped up by the fast-moving strip and must be held back by means resulting in poor control, erratic distribution of coating, and surface defects. Additional defects are developed at the tin, flux, and oil interfaces. Because of these difficulties the industry turned toward the electro-deposition of tin, and in the last decade efforts have been devoted largely to the development and refinement of this novel method of tin plating.

An economic urge also was back of the early development of electrolytic tin plate. It was felt that the weight of coating might reasonably be reduced for containers holding the so-called dry packs. Tin-plate producers were under pressure for a cheaper product to compete with paper and fiber for these less severe requirements. A radical attempt was made to save one pound of tin and establish an electrolytic coating of 0.5 pound per base box. This lower coating was further justified by its high degree of uniformity — variations of only a few hundredths of a pound per base box are encountered — in comparison with the hot-dipped coating, and by the elimination of hot-tinning losses due to pot drosses and heavy drip edges on the plate. The saving in tin was appreciable and supported the position of the tin can.

Within several years, the production of electrolytic tin plate had increased in 1940 to more than a million base boxes annually. Small lots of this early electrolytic plate carrying coatings of 0.25 and 0.10 pound per base box were also tried experimentally, for dry- or general-line can and closure purposes, with encouraging results. The can and closure manufacturers co-operated in this pioneering work of solving the forming, soldering, and lacquering problems, which later was to prove so important in the tin conservation necessitated by war.

The pioneer commercial electrolytic tin plate was produced by electrodeposition from a sulphonic acid electrolyte. The steel strip was cleaned rapidly by electrolytic pickling and washing; the tin deposited, washed thoroughly, and brushed lightly for uniform appearance; and the resultant product was finally sheared into the sheets required for the subsequent forming of containers and closures. The automatic conveying, coating, and treating of the light-gauge and relatively soft strip required many novel mechanical and electrical developments in the way of drives, guides, and controls for the relatively high speeds of several hundred feet per minute. High speed and volume production are necessary with the high investment cost of the complex mechanical and electrical installations required for a uniform and low-cost product. In some plate produced at this early date, the coating was melted following electrodeposition and duplex coatings or undercoatings of other metals, especially copper, were applied. These developments, particularly the latter, were not too sound economically at the time and did not enter seriously into the commercial production of early electrolytic plate.

After the electrolytic plate from the acid electrolyte had come to an interesting age with a million-box production, a commercial unit began operations with an alkaline electrolyte. The coating was not melted, had a

uniform matte finish, and found considerable application in the cap and closure industry. The surface simulated certain bright decorative enamel coatings and was hailed by the crown cap industry as the eventual universal raw material.

With war thrust upon us, the tin-plate, container, and closure industries faced a serious crisis. Even with the reduced coating of 1.25 pound per base box on hot-dipped plate, there would have been only enough tin for the essential requirements of the military services. This would have left none for civilian requirements, with consequent serious effect on our food supply and economy. A conservation program was established by the can industry and the War Production Board whereby electrolytic tin plate, and to a lesser extent chemically treated black plate, would gradually be introduced for food containers. Tin and also steel were prohibited for many nonessential packs. The use of glass containers was expanded with an increased production of tin-plate closures but with conservation in total plate.

The introduction of electrolytic tin plate for food containers required intense action. The research organizations of the can industry guided the steel industry as indications of the requirements were obtained from extensive service-life studies. This early electrolytic plate brought many troubles in the manufacture of cans. Soldering on body lines at high speed was most troublesome. The high-temperature baking of enamel coatings discolored the plate with a brown oxide so that it was not only unsightly but interfered still further with the high-speed soldering. Changes in electrolytes and improved chemical treatment of the finished plate were helpful. Storage stability, die action, and feeding properties were improved by better cleaning, chemical treatment, and the application of very light oil or suitable plasticizer films to the finished electrolytic plate by improved methods. Adherence of enamel and the inking of the plate were improved by similar developments, although these important problems still require further study.

Early experience proved that a dense bright melted coating gave higher resistance to corrosion within a can. One small pioneer unit had been operating with oil melting. Subsequently, larger melting units were installed, utilizing heat resulting primarily from direct electrical resistance of the steel or tin-plate strip, radiation from gas-heated tubes, or high-frequency induction of electric current in the strip. Melting units were installed for both acid and alkaline electrolytic lines, generally directly in line but in some cases as separate operations.

Within a short time the steel industry had installed 27 electrolytic tin-plate lines at a cost of about \$30,000,000 and with an annual rated capacity of 35,000,000 base boxes. An additional line is being installed in England. About two-thirds of the installed capacity utilizes an acid electrolyte, either the pioneer sulphonic bath or the chloride bath. Other installations make use of alkaline sodium stannate or the more efficient and improved potassium stannate bath. Tin is deposited more efficiently and at a much higher rate from the acid than from the alkaline electrolyte. As a result the alkaline installations provide much longer travel in the electrolyte. Vertical looping through the acid electrolyte permits a more efficient and more compact unit with advantages in automatic control, adjustment of anodes, and uniformity in distribution of the coating. (Continued on page 52)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

The Institute Evaluates Its War Record

Significance of M.I.T.'s War Research and Educational Activities Is Revealed in President Compton's Annual Report

IN an annual report unique in the Institute's history, President Compton presented to the Corporation on October 8 a record of the Institute's outstanding achievements during the war years. Dr. Compton's report will be of interest not only to Technology men but to all who are cognizant of the era of change in which we live, for it presages the complete dependence which the nation places on its men of science and engineering and subtly hints of the responsibilities which this group will be expected to assume in the future. The 1945 report is primarily an historical survey of developments which can be related now that the war is over, but the present and future also come in for searching examination. The present is viewed as a transition period looking toward the resumption of new peacetime conditions in which the broad objectives of last year's postwar planning program are already rapidly taking shape. That portion of Dr. Compton's report which deals with the work of the Radiation Laboratory—the largest single unit of the Institute's many wartime responsibilities—is presented in this issue of *The Review*; a subsequent issue will contain that portion of the report dealing with other wartime projects, future plans, finances, and related activities.

In opening his report, Dr. Compton stressed the important part which educational institutions play in this country's economy, stating:

Our American way of life is the ever developing product of the effort and sacrifice of many generations, spanning many countries and centuries, to achieve personal, political, and religious freedom; to build a civilization in which opportunity, security, and a high standard of living shall be available to all under the ethical principles of Christ. We were all too slow in waking up to the threats against these ideals which gathered, like storm clouds, in the 1930's around the Fascists, the Nazis, and the war lords of Japan. After the storm broke, it was only the most co-operative determination to preserve these ideals which saved the world from domination by ambitious powers bent on an exploitation and self-aggrandizement which would have plunged the world back into the dark ages.

In this co-operative, all-out effort, our educational institutions have played a notable role. Whereas the Army and Navy constitute our first line of defense, I venture the statement that our educational institutions rank with our manufacturing industry and transportation system as the principal supporting lines of military power in time of war and of reserve strength in time of peace. In peace, they educate men for every aspect of our national economy in which higher education is important. In war, they are ready-made centers for housing and training of officer and specialized personnel; their faculties are the most readily available source of experts for the numerous emergency boards, committees, and expanded technical services; their laboratories and staffs become productive centers for research

and development on new instrumentalities of offensive and defensive warfare. . . . Although the public frequently conceives of the academic scientists as visionary, impractical, and out of touch with the facts of life, the record of this war demonstrates their vision, sound judgment, and practical skill to be one of our most significant sources of national security and strength.

First to be acknowledged in the war record were the 8,776 Alumni, headed by 92 generals and 35 admirals in the armed forces of the United States and its allies, to whom Dr. Compton paid special tribute. Of these men, 148 made the supreme sacrifice for their country. Nearly 200 members of the Institute's pre-war staff of 681 were granted leaves of absence to accept a wide variety of war assignments. Every remaining member devoted full or substantial time to essential war work at the Institute, in research, teaching, or administration.

A considerable portion of the Institute's activities during the past five years has been devoted to work in furtherance of this country's war work. The Institute has engaged in 400 war contracts of which 161 have been made directly with the Army, Navy, or other governmental agencies, 89 with the Office of Scientific Research and Development, and 150 with industrial firms. In addition, there were 275 orders for work in the wind tunnel. Contracts for research and development totaled \$93,031,000, and those for special training courses increased this amount by another \$5,217,500.

First under the Engineering, Science and Management War Training Program and later under the Navy V-12 and the Army Specialized Training programs, the Institute has assumed its share of war training instruction. A total of 3,291 man-years was handled in these categories. In addition, M.I.T. gave instruction to a considerable number of naval officers of our Allies, conducted numerous specialized courses, mostly at graduate level, and was one of five institutions selected to train Army and Navy personnel in meteorology and weather forecasting. Its Radar School was the center for advanced radar training of naval officers of whom a total of 4,742 were enrolled. Many of these officers received additional training in naval air-borne radio communication equipment or in sonar equipment used for underwater detection of submarines or mines. A total of 2,524 Army officers took essentially the same course, modified for their purposes and equipment.

A considerable portion of Dr. Compton's report was devoted to the Radiation Laboratory since it was the largest and most comprehensive of the Institute's war activities and was described as "the only one which was of such magnitude that mishandling of it could have wrecked the Institute financially and in reputation." The work of the Radiation Laboratory is substantially completed, and its orderly liquidation, final accountability and financial settlement, and fair treatment of its disbanding staff, although difficult problems, are well in hand.

Elsewhere in this issue is an account of some of the legacies which the Radiation Laboratory makes to civilian progress in electronics, radar, and radio techniques. Dr. Compton's report is concerned with the organization of the Radiation Laboratory and its work in the development of microwave radar systems and equipment for use by our armed services. An extract of Dr. Compton's report dealing with the Radiation Laboratory follows:

In the fall of 1940 the Radiation Laboratory was established at Technology under Office of Scientific Research and Development contract as a distinctly co-operative enterprise. Staffed by scientists and engineers made available from institutions all over the country, it embarked on a new approach to radar development, involving equipment, methods, and scientific knowledge that were then largely unknown. This venture proved to be one of the most productive and useful enterprises of the war, and out of it grew a new art, with applications the variety and importance of which were not even dreamed of at the start. Its success is a tribute not only to the practical creative genius of "academic" scientists but also to the whole-hearted, effective co-operation of many industrial companies and of forward-looking officers of the Army and Navy. Exchange of information, and even of personnel, was maintained with the radar groups of the United Kingdom.

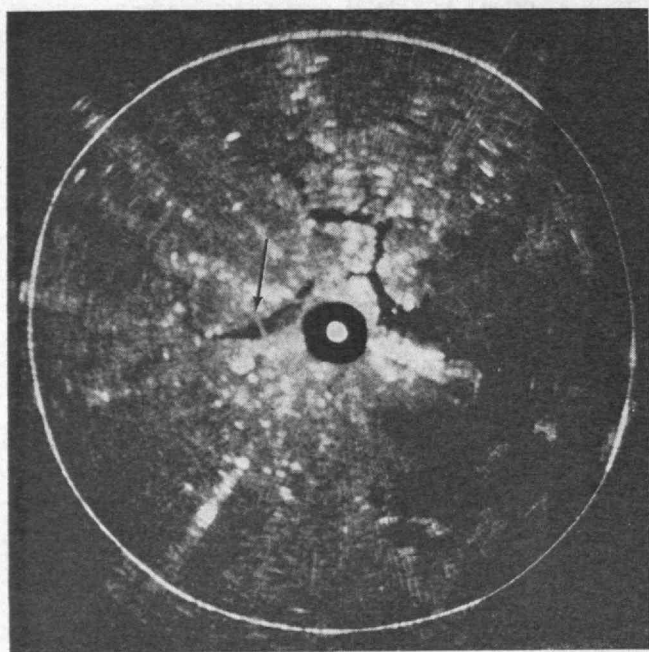
From its small beginnings late in 1940, this laboratory grew to a scientific and technical staff of 1,200, plus 2,700 technicians, assistants, mechanics, stenographers, business staff. It occupied 15 acres of floor space in Cambridge; it operated large sub-laboratories at the East Boston and Bedford airports and smaller ones at various times in Quonset, New London, Orlando, Panama, and elsewhere. It maintained a very active branch laboratory in England and smaller stations in France and Australia. At the close of the war it was organizing a section of over a hundred men and several hundred tons of equipment for Manila, to serve the forward Pacific areas. Its staff have operated in every war theater, from North Africa to China, from the Aleutians to Australia. It was visited by some 86 officials daily from Army,

Navy, or manufacturing concerns, and 180 Army and Navy officers were in residence at the laboratory for liaison purposes. Its operating expenses during the last year ran about \$3,000,000 a month. . . .

The H_2X air-borne radar set, originally designed in the Radiation Laboratory, was to be built in huge quantities as standard navigating and "bombing through overcast" equipment for all heavy bombers. But it took time to get the assembly lines running, and the urgency was great. . . . Lieutenant General James H. Doolittle, '24, sent to Boston 12 of his experienced Pathfinder crews, who flew the new equipment around New England till all adjustments were perfected and the crews were thoroughly familiar with it. Then they flew the planes to England and led all the "instrument" bombing raids of the Eighth Air Force over Germany from November 1, 1943, to March 15, 1944. . . . It was this laboratory-built equipment which kept the Eighth Air Force bombers effectively in the air during those critical four and a half months.

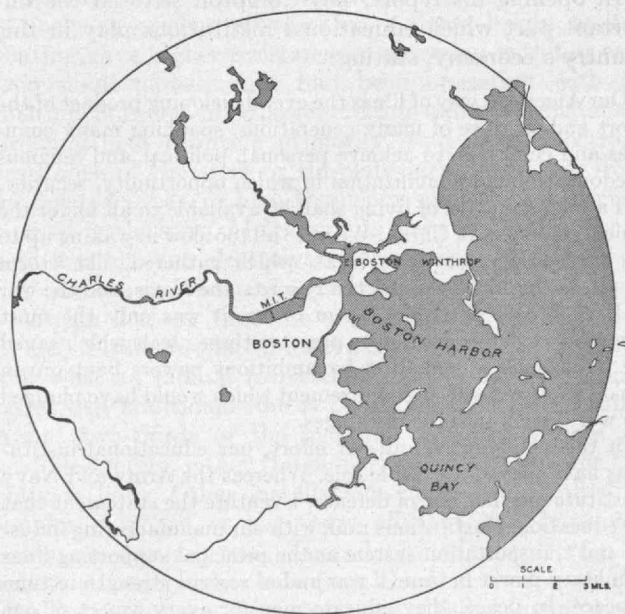
In 1941, a group from the Radiation Laboratory submitted to the Army and Navy a new scheme for long-range navigation, based on radar principles and now known as "Loran." . . . The Loran equipment, built and largely installed under the Radiation Laboratory contract, proved most successful. Now the Atlantic and Pacific are covered by the Loran network, produced by a few shore stations. Any ship or airplane, carrying lightweight receiving equipment, can locate its position quickly and reliably, independently of chronometer and astronomical observations. Many transoceanic air transports, military aircraft, and ships now use this navigation method, which is one of the permanently useful products of war research.

Among the earlier devices developed in the Radiation Laboratory was the now justly famous SCR-584 set for directing anti-aircraft fire. It substitutes radar for visual tracking, and it functions automatically and reliably through fair or foul weather. The production contract for this equipment was the first example in the radar field where sufficient faith was shown in a laboratory model to countenance plunging into a huge production contract without the usual time-consuming peacetime schedule of preproduction models, tests, and standardization preceding the production contract. On the basis of the per-



M.I.T. Radiation Laboratory

Radar photograph of downtown Boston and adjoining areas as reproduced on a plan position indicator in an airplane over Boston Common. Although this picture does not show the detail which is attainable with high-definition radar equipment, important land and water masses are readily distinguished. This photograph, unretouched except for the arrow indicating the position of the In-



stitute's Radiation Laboratory, which developed microwave radar systems during the war, shows what the pilot sees, even though ground is obstructed by fog or clouds. The distances shown on the screen of the oscilloscope are slant height rather than true distances along the ground. At the right, for comparison purposes, is a map of the corresponding region, drawn to the same scale.

formance of the model built by the Radiation Laboratory, this production contract was placed, exceeding in dollar value the entire cost of the Boulder Dam project. It was one of the war's best investments. . . .

The [German] submarines had learned to avoid and counter a British type of radar detection device which [in 1942] was also in use by us. A more powerful and accurate radar device, and one much more difficult to escape, had just been developed by the Radiation Laboratory and was going into production. But without waiting for this, the Army Air Forces, backed by Secretary of War Stimson, got together a special small squadron of the old B-18 airplanes and had the Radiation Laboratory install its new ASV radar equipment in them at the East Boston airport. It also installed certain magnetic equipment for detecting iron vessels at short range, which had been developed and built under an O.S.R.D. contract with Columbia University. Armed thus with equipment to locate submarines at considerable distances on the surface and at lesser distances submerged, and supplied with bombs and depth charges, this little Air Forces squadron pursued the submarines by day and by night all along the coast from Halifax to South America, wherever they were reported. The results were immediate and effective, and the submarines largely stopped their operations near our coast. This was the turning point of the submarine war. . . .

The most powerful radar set on which information has been released is the huge MEW (Microwave Early Warning). This was designed and built in the Radiation Laboratory and tested in the air-defense network in Florida. Simultaneously, five other introductory sets were built. . . . These five sets played a notable role in the latter phases of the war. The first was mounted near the southwestern tip of England. It immediately proved its ability to detect the approach of enemy aircraft toward any region of southern England. . . . The set was used to direct our fighter escorts as, in successive waves, they took over the protection of our great bomber formations flying to and from Germany. Finally, after the Normandy invasion, each American army was backed by one of these five MEW sets to guide the close supporting tactical aircraft toward their targets. . . .

Still another radar application wholly developed in the Radiation Laboratory is the Ground Controlled Approach system for landing aircraft even when the field and its approaches are completely obscured by fog or darkness. This differs from all other blind-landing systems in that it requires no equipment whatsoever in the plane except the ordinary radio communication set; it requires only willingness of the pilot to follow instructions received through his earphones and requires no training in the use of special equipment. The equipment is mounted in a truck and can be run onto an airfield and set up for operation in a few minutes. Its operators see on a screen a line which indicates the proper approach and landing path for the incoming plane. They also see on the screen the location of any obstacles which must be avoided. They see at every instant the location of the incoming plane as a spot moving, if all is well, right along the ideal landing line. They can tell at a glance if the plane is to the left or the right or above or below this ideal line, and by how many feet. They can talk to the pilot over the radio communication system and tell him just what to do to keep on the line. . . .

Two factors have slowed the rapid adoption of this device: One is the powerful backing for earlier blind-landing systems, and good ones; another is the greater faith of pilots in an instrument which they can see than in a voice which they can only hear. Nevertheless, this equipment has already saved planes and pilots who had never heard of it until they were caught above an airfield with zero ceiling and were "talked in" to safety. . . .

Back of these developments went an enormous amount of painstaking scientific research, theoretical and experimental, often on subjects which to the uninitiated would appear to have no relation to radar—subjects like the quantum theory of molecular spectra, or electron optics, or the oscillations of coupled systems.

The organization of the Radiation Laboratory makes it clear that, while M.I.T. can take just pride in its accomplishments, this pride can also be shared with many other organizations. The Institute took the contract, the responsibility for management and performance, and some very considerable financial risks; it furnished a small portion of the personnel and selected and employed the rest; it established the working pattern of the organization. Once established, the technical work of the laboratory was ably guided by its director, Lee A. du Bridge, supported by a steering committee composed of the heads of the various departments into which the laboratory was divided. The program was subject to periodic review and occasional redirection by a committee of the National Defense Research Committee of O.S.R.D., headed by Alfred L. Loomis. This committee, acting much like a board of directors, included scientists or engineers from M.I.T., the University of California, Columbia University, the University of Rochester, the Bell Telephone Laboratories, the General Electric Company, the Westinghouse Electric Corporation, the Radio Corporation of America, the Sperry Gyroscope Company, the General Radio Company, and the War Production Board. Through these men, constructive criticism and co-operation with industrial firms were always available. Then the programs in their more general aspects, and especially the budgets, were checked and approved by the N.D.R.C., and final authorization was given by Vannevar Bush, '16, as director of O.S.R.D. At every level in this organization, close contact was maintained with the Army and Navy through their appointed liaison officers or through actual membership of their officers on committees. I mention these organizational details to emphasize the widely co-operative character of the Radiation Laboratory enterprise and hence the widely shared credit for its success.

While many of the Institute's war activities have resulted in projects whose benefits and scope are readily apparent, some of the less apparent operations have been equally important. Not the least important and far from the least difficult has been its work in formulating and negotiating war contracts and developing policies for the administration of these contracts. Dr. Compton states:

Because of its strategic position, its early acceptance of a large war contract, and its previous intensive study of somewhat analogous problems of institutional policy, M.I.T. was usually the first of the academic institutions to tackle these problems of policy and contract. Many times it was purposely chosen as a proving ground by various governmental contracting agencies. The results were widely followed in other institutions. . . .

Turning now from the Institute's war activities and some of its achievements, let us try to evaluate the effect of the war program on its financial and physical resources. Here it will be found that the Institute made a substantial over-all, out-of-pocket contribution. In other words, the war cost the Institute money. This contribution was made freely and gladly and was entirely proper, since the war was costly to the entire nation and to every patriotic element in it. . . .

With the early realization, in the summer of 1940, that our country was faced with a great crisis, M.I.T. adopted a firm policy *always* to give first precedence to any important opportunity for service in the crisis; *never* to let this service be delayed by arguments over conditions or contracts; *never* to let the self-interest of the institution prevail over the interests of the nation. . . .

The Institute has also adopted the policy that it would accept no profit on the war work it undertook for the government. It deposited with its chief governmental contracting agency, the Office of Scientific Research and Development, a vote of its Executive Committee to return to the government any net profit, if it should find on termination of the contracts that there had been a profit.

The Corporation Elects

HARRY C. WIESS, President of the Humble Oil and Refining Company of Houston, Texas, was elected to special term membership on the Corporation at its June 25 meeting. Mr. Wiess succeeds Edward R. Stettinius, Jr., whose term expires this year.

One of the organizers of the Humble Oil Company in 1917, Mr. Wiess has been president of the company since 1937, after having served as vice-president and later as executive vice-president. He is a trustee of Rice Institute in Houston and also of the Kinkaid School in Houston. He has been a member of the Petroleum Industry War Council, chairman of the Houston Community Chest, and chairman of the U.S.O. for the state of Texas.

Mr. Wiess was graduated from Princeton in 1909. From 1910 to 1917 he was affiliated with the Paraffine Oil Company in Beaumont, Texas, serving as president from 1912 to 1917. He is a member of the American Institute of Mining and Metallurgical Engineers.

His clubs include the Bayou, Texas Corinthian Yacht, Houston Country, and Tejas, of Houston; the Beach Club of Galveston; the Cannon Club of Princeton; and the Eagle Lake Rod and Gun.

Retirement

THE retirement of Professor Henry H. W. Keith, '05, of Newton Center, Head of the Department of Naval Architecture and Marine Engineering since 1937, was announced in July. Professor Keith will retire on January 1 with the title of professor emeritus, after an association with the Institute as student and teacher for some 35 years.

In addition to his work as professor of naval architecture, he has served for the past 20 years as consultant at the Fore River plant of the Bethlehem Steel Company's shipbuilding division in Quincy, where he has planned many difficult launchings, including that of the famous airplane carrier U.S.S. *Lexington* in 1925 and the battleship U.S.S. *Massachusetts* in 1941. He is also widely known as an authority on the design and construction of naval vessels and especially on the powering of ships. For five years after his graduation from the Institute in 1905, he was engaged in research at the United States Experimental Model Basin at the Navy Yard in Washington, D. C., where he worked under Rear Admiral David W. Taylor, in whose honor the newer model basin at Carderock, Md., is named.

The Department of Naval Architecture and Marine Engineering at the Institute is the largest of the three American schools giving professional instruction in this field, and as head of this Department Professor Keith has had a major role in the training of naval architects and marine engineers. The Department has trained United States Navy construction and engineering officers who have played an important part in building the American Navy of today. In addition, the Department has instructed many student officers of foreign navies in naval construction and engineering and has conducted a course in marine transportation. During the present war period, several special intensive courses in the fields of naval architecture and marine engineering have been given.

Professor Keith's teaching career at M.I.T., which began in 1910 when he was appointed instructor in naval architecture, was interrupted at the time of World War I

by his active service as lieutenant commander in the Construction Corps of the United States Naval Reserve. At the time of his enlistment, he was assistant professor of naval architecture. Thereafter he served as associate professor from 1922 to 1928, when he became a full professor. Eight years ago he succeeded Professor James R. Jack as head of the department.

Professor Keith is a member of the Society of Naval Architects and Marine Engineers, the American Society of Naval Engineers, the United States Naval Institute, the North East Coast Institution of Engineers and Shipbuilders of England, the Military Order of the World War, the Naval Order of the United States, and Sigma Xi. A native of New Bedford and a graduate of its high school in 1897, he attended Mosher's Preparatory School before entering the Institute as a student in 1901.

Frank William Lovejoy, 1871-1945

FRANK WILLIAM LOVEJOY, '94, chairman of the board of directors of the Eastman Kodak Company, died in Rochester, N. Y., on September 16, and in his death the Institute has lost one of its most distinguished and devoted Alumni, and the Corporation a life member whose service to M.I.T. has for a generation been constant and of the highest order.

His career of 47 years with the Eastman Kodak Company is an epic. From 1906 when he became general manager of the manufacturing departments until 1944 when illness diminished his activity, he was a major figure in the central management of the company. On entering its employ in 1897 he shared a desk with the plant chemist and was at once catapulted into a series of new tasks and responsibilities. He had not been working long at Kodak Park when George Eastman wrote to his partner, Colonel H. A. Strong, "Mr. Lovejoy is taking hold fully as well as I expected. He may turn out to be a very valuable manager."

Lovejoy impressed his associates with three main characteristics: his capacity for continual, unrelieved hard work, the breadth and depth of his business point of view, and his human approach to all questions. It was because of these qualities that he became so indispensable and so accessible to Mr. Eastman, who first became interested in M.I.T. through Frank Lovejoy. It was through his influence and action that Dr. Maclaurin was brought into personal contact with Mr. Eastman, the outcome of which was the magnificent series of benefactions to the Institute which have made the Eastman name an honored one in the annals of Technology. In February, 1912, Mr. Lovejoy wrote to President Maclaurin as follows:

While talking with Mr. Eastman today, he referred to your visit to Rochester recently and expressed regret that he was out of the City and so missed the opportunity of meeting you. I told him something of your visit and as much as I could recall of the things you told us of the recent developments that had made a new Technology possible, of the plans for the expansion on the new site, and of the necessity for raising among the alumni and the friends of the Institute the large sum that will be required.

At the end of our talk, he remarked that when the time came for financing the project he would be inclined to help out. I was very much pleased, but not altogether surprised because Mr. Eastman has in recent years shown much interest in Technology and seemed to have quite a bit of knowledge of what was being done.

I said that I felt sure that at the proper time you would be glad to come to Rochester to put before him the plans and needs of the new Technology.

Would it not be well for you to write to Mr. Eastman within a few days referring to the receipt of this letter and confirming my statement to him of your probable willingness to meet him here at an appropriate time and at the mutual convenience of both? ¹

Although notably modest and unassertive in his bearing and never clamoring for personal recognition, Frank Lovejoy was a great industrialist, a great civic leader, and a wise and important counselor in national affairs affecting industrial and social relations.

Born in Concord, N. H., on December 11, 1871, son of George Lyman Lovejoy and Caroline Neal Lovejoy, he was of pioneer New England stock and believed in the New England traditions of integrity, industry, hard work, and self-reliance but always with generous readiness to help his neighbor or those less fortunate or gifted than himself. These traditions he carried through life and applied in his business and personal relations and in the social, civic, and charitable movements in the city of Rochester. He was thus, in a sense, a logical successor to Mr. Eastman.

Mr. Lovejoy's early education in the public schools of his native city was augmented by private instruction. In 1890 he entered the Institute, where he pursued the Course in Chemical Engineering and throughout his four years was a student of outstanding ability. Although never seeking prominence in undergraduate affairs, because of his character and ability he was widely known and held in highest respect by his classmates. He was a member of the Phi Beta Epsilon local fraternity.

Soon after his graduation he spent six months as chemist at a Louisiana sugar central, and this experience was followed by two years as draftsman and chemist for Curtis, Davis and Company, the then well-known Cambridge soap manufacturers, later purchased by Lever Brothers Company. In 1897 he entered the employ of the Eastman Kodak Company to take charge of the production of sensitive emulsion for films, which were then just coming into general use. As the company rapidly expanded, he was given more and more responsibility and was made vice-president in 1919, general manager in 1925, president in 1934, and chairman of the board in 1941. Although in impaired health, during the war years he directed and increased the great production and facilities of the company and its subsidiaries.

For more than a quarter of a century Lovejoy's relations with the Institute, both with the Alumni Association and the Corporation, were intimate and invaluable. In 1917 and 1918 he was a representative at large of the Alumni Council and was vice-president of the Alumni Association from 1920 to 1922. In the latter year he was elected by the Alumni as a term member of the Corporation, and at the end of his term in 1927 he was elected a life member of the Corporation. Then for the five years preceding Mr. Eastman's death both men were life members of the Corporation, much to the Institute's advantage.

Mr. Lovejoy's interest in industrial matters was not confined to his own great business. He was active in affairs of the National Association of Manufacturers and served for seven years as a vice-president and director. In 1932

¹ H. G. Pearson, *Richard Cockburn MacLaurin* (New York: The Macmillan Company, 1937), pp. 120-21.



Eastman Kodak Company photo
Frank William Lovejoy, '94

he directed the National Share the Work Movement in five counties in northern New York. In 1941 and 1942 he was chairman of the National Industrial Conference Board. He took an interest in national legislation and was outspoken in his objections to proposals for action leading toward what he designated as "steadily expanding bureaucracy" and the unusual tax burdens and restrictive regulations which in 1936 were placed upon industry.

Honors came to him, of which perhaps those most pleasing to him were the award of an honorary LL.D. degree from Colby College in 1937, honoring the martyrdom of Elijah Parish Lovejoy, one of his ancestors, and the award by the Rochester Museum Association of its 1941 civic medal in recognition of "eminence in the field of industrial science and community leadership." He was also awarded the LL.D. degree from St. Lawrence University and an honorary Sc.D. degree from Lawrence College.

In addition to membership on the Institute Corporation, he was a trustee of the University of Rochester, director of the Security Trust Company of Rochester, member of the American Chemical Society, the American Society of Mechanical Engineers, the Rochester Engineering Society, the Masonic fraternity, the Rochester Country, University, and Genesee Valley clubs in Rochester, and the Technology, Engineers', and Chemists clubs in New York City.

Appointed

THE appointments of Robert S. Williams, '02, as dean of Army and Navy students, Edwin R. Gilliland, '33, as deputy dean of engineering, Jerrold R. Zacharias as professor of physics, Ivan A. Getting, '33, as associate professor of electrical engineering, and Godfrey T. Coate

as assistant professor in the Department of Electrical Engineering have been announced recently.

As dean of Army and Navy students, Dr. Williams will co-ordinate the advanced training programs for Army and Navy officers at the Institute. He will look after the interests of the services and of the officers detailed to study here and will be available to assist any Army and Navy student officers who have academic problems. While in this post, Dr. Williams will continue to serve as head of the Department of Metallurgy.

Dr. Gilliland comes to his new position of deputy dean of engineering after almost three years of war leave from the Department of Chemical Engineering. As assistant rubber director in charge of research and development, he contributed notably to the successful establishment of a synthetic rubber industry in this country. More recently he has been on duty with the Office of Scientific Research and Development in Washington.

For outstanding achievement in the fields of heat transmission, diffusion, distillation, and high-pressure synthetic chemistry, Dr. Gilliland was recently named first recipient of the Leo Hendrik Baekeland Award of the North Jersey section of the American Chemical Society. The \$1,000 award and gold medal were presented to him last May.

Dr. Gilliland joined the staff of the Department of Chemical Engineering as an instructor shortly after receiving his doctor of science degree from the Institute in 1933, and he became a full professor last year. A native of El Reno, Okla., he received the degree of bachelor of science from the University of Illinois in 1930 and the master's degree from Pennsylvania State College in 1931.

Jerrold R. Zacharias, recently appointed professor in the Department of Physics, soon after receiving his doctorate from Columbia University became a member of the molecular beam laboratory at that university under the direction of Professor I. I. Rabi. He was a member of the group which carried out a distinguished set of investigations of magnetic properties of atomic nuclei from 1933 to 1940, for which Dr. Rabi was awarded the Nobel Prize in 1944.

Since 1940, Dr. Zacharias has been a member of the staff of the Radiation Laboratory at the Institute and was for some time leader of the largest division of the laboratory. He has since been associated with another government project. In his new post in the Department of Physics, Dr. Zacharias expects to continue research in the field of molecular beams and nuclear structure.

He is a native of Jacksonville, Fla., and was educated at Columbia University, where in 1926 he was awarded the degree of bachelor of arts followed by the master's degree in arts in 1927 and his doctorate in philosophy in 1933. He was tutor in physics at the College of the City of New York in 1928 and 1929 and held a similar position at Hunter College in 1931, being appointed instructor in 1935 and assistant professor of physics in 1936.

Ivan A. Getting, '33, returns to the Institute as associate professor in the Department of Electrical Engineering after heading a division of the Radiation Laboratory where he directed research and development in the general field of radar application to gunnery and associated problems.

The apparatus developed by Dr. Getting's division was considered an important contribution toward shortening the war. An outstanding achievement of the division was

the automatic antiaircraft set which distinguished itself in the critical days of the Anzio beachhead and was exceptionally effective in defending London against German buzz-bomb attacks. The versatility of the set is indicated by the fact that it was also used in tracking airplanes and directing them on tactical missions, especially during the battle of the bulge in Belgium. It has been used to track shells in flight to determine the ballistics of projectiles and has been useful in assembling bombing tables by tracing bombs released from high altitudes. Bombardiers found the set particularly useful in evaluating bomb runs through accurate tracking of the bombing plane. It was also employed in directing ships during mine and cable laying operations as well as in the tracking of mortar shells to locate enemy guns. Another set developed by the division directed by Dr. Getting represents the most accurate gunnery control device in existence and has become standard equipment for seacoast artillery.

During his war service, Dr. Getting was a member of a fire-control division of the National Defense Research Committee; expert consultant to the Secretary of War from 1942 to 1944, when he was assistant to Edward L. Bowles; consultant to the Von Karman Scientific Advisory Committee to the commanding general of the Army Air Forces; and a member of the subcommittee on radar gunnery and searchlight control for the combined chiefs of staff.

Dr. Getting is the son of Mr. and Mrs. Milan A. Getting of Pittsburgh and the brother of Dr. Vlado A. Getting, commissioner of health for the state of Massachusetts. He was born in New York and prepared for entrance to the Institute at the Schenley high school in Pittsburgh. He was graduated from Technology in 1933 and as a Rhodes Scholar at Oxford University was awarded his doctorate in philosophy in 1935. From 1935 to 1941 he was a junior fellow in the Society of Fellows at Harvard Uni-



Ivan A. Getting, '33

Associate Professor of Electrical Engineering

versity, and from 1940 to the present time he has been associated with the Radiation Laboratory.

Godfrey T. Coate, born in New Orleans in 1916, becomes assistant professor of electrical engineering on November 1. He received his early education in his native city and later received the degree of bachelor of engineering in 1937 and the degree of master of science in 1939, both from Tulane University. From 1939 to 1942 he was an assistant in the Department of Electrical Engineering and then was an instructor in that department until 1943. At that time he became an instructor in the Institute's Radar School, from which he returns to the Department of Electrical Engineering.

Homes for Married Students

THE Institute's plans for aiding married students in finding suitable housing include two newly organized projects. One of these, a Housing Bureau with an expert staff, will assist students in finding suitable quarters in the Greater Boston area. The aim of the second project is to relieve, to some extent, the shortage of housing facilities for enrolled students. Known as "Westgate," this project is a housing development of 100 dwelling units on the campus in which occupancy will be confined for the present to honorably discharged veterans of World War II and their families.

On October 22 the Institute opened a Housing Bureau, charged with the approval of applications for houses in the Westgate development and with the rendering of assistance to married students in finding outside accommodations, furnished or unfurnished, including temporary quarters when necessary. Applicants for admission who are married are encouraged to make their needs known to the Housing Bureau well in advance and are urged to postpone bringing families to Cambridge until arrange-

ments for satisfactory living accommodations have been completed.

On the 10-acre plot situated on Institute land in Cambridge west of Massachusetts Avenue between Memorial Drive and Vassar Street, the Institute has under construction 100 small homes. This temporary residential project has been planned as the result of the acute housing shortage in the Boston-Cambridge area and will include 50 houses containing one bedroom and 50 houses containing two bedrooms.

The houses, arranged in single and twin units, are similar to small apartments with the privacy of a house and with the additional advantage that each house has its own plot of land. Both the single-bedroom and double-bedroom houses contain combined living rooms and dining rooms, separate kitchens, and ample closet space. The houses are insulated and are heated by gas. Parking space is sufficient for cars of both tenants and guests. Off-highway arrangement provides safe play space for children, although it is not expected that any of the houses will be occupied by families having children of school age.

This project is part of the Institute's preparation for an expected increase in enrollment of between 30 and 50 per cent above normal in the next year. Applications indicate that among the large group of returning veterans many are married. A survey of housing facilities in Greater Boston shows that it would be virtually impossible for married veterans to find accessible quarters at rents they could afford to pay. Therefore, in keeping with the Institute's policy of giving returning soldiers every possible assistance in completing their education, the Executive Committee of the Corporation approved an emergency housing project. Officials of the city of Cambridge gave encouragement to the undertaking as an important part of their over-all plan for the housing of returning veterans.

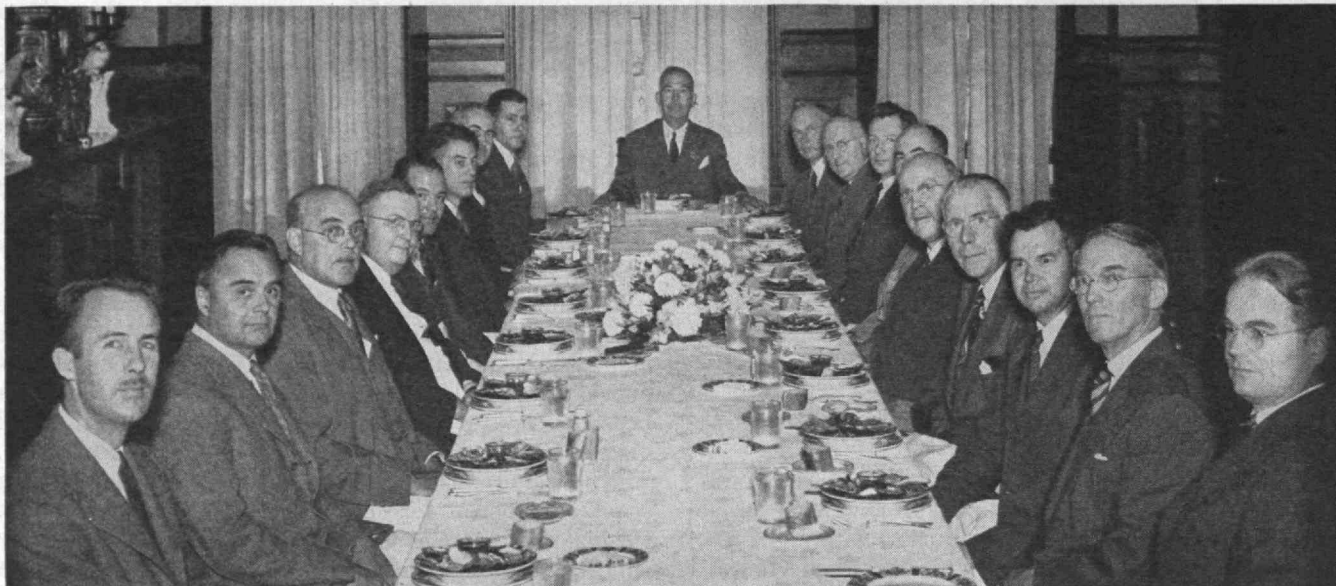
The plan provides educational and social facilities for married students by a natural banding together of young couples with similar educational goals. The pleasant atmosphere of social home life is made possible by assigning a private house to each family. At the same time, the carefully designed grounds of this study community will permit young mothers to combine their duties in the care of children and so gain time for shopping and social activities. The location of the project on Institute property near Memorial Drive affords a degree of seclusion coupled with accessibility.

One of the greatest benefits of the project will be its location close to the Institute. This will enable students to make the most effective use of their time for studies and home life by keeping commuting time to an absolute minimum. Easy access to the Institute's libraries will facilitate evening study. The project will thus encourage the scholarship of veterans returning to academic programs from various activities of life in the service.

This project, which is being developed under the direction of the Institute's School of Architecture and Planning, headed by William W. Wurster, dean, is designed to provide facilities for a period of about five years, after which it is expected to be removed. This temporary group will serve the added purpose of a pilot study of what may be needed in the way of future permanent housing for married students, research assistants, and young instructors.



Jerrold R. Zacharias
Recently appointed Professor of Physics



*Celebrating their company's participation in the establishment of the Institute's gas turbine laboratory, Westinghouse Electric Corporation officials met with representatives of the Institute for a luncheon at Boston's Algonquin Club on September 24. Those attending the luncheon were, in the usual left-to-right order: Robert M. Kimball, '33, Administrative Assistant to the President; C. Fayette Taylor, '29, Professor of Automotive Engineering; Oliver Wyman; H. E. Lobdell, '17, Dean of Students; H. H. Rogge, Commercial Vice-president; * H. C. Hotel, '24, Professor of Fuel Engineering; George R. Harrison, Dean of Science; James R. Killian, Jr., '26, Executive Vice-president; F. L. Nason, New England district manager; * John L. Hall, a member of the board of directors; * Carlton E. Tucker, '18, Professor of Electrical Engineering; Harold L. Hazen, '24, Head of the Department of Electrical Engineering; J. P. Den Hartog, Professor of Mechanical Engineering; L. E. Osborne, Vice-president in charge of the Philadelphia works; * C. Richard Soderberg, '20, Professor of Mechanical Engineering; John C. Slater, Head of the Department of Physics; Frederick G. Keyes, Professor of Physical Chemistry; and Edward S. Taylor, '24, Professor of Aircraft Engines.*

Gas Turbine Research

GIFTS totaling half a million dollars for establishing at the Institute a gas turbine laboratory for graduate instruction and fundamental research in this new and promising field of engineering have been announced by Jerome C. Hunsaker, '12, Head of the Departments of Aeronautical and Mechanical Engineering.

Recent advances in gas turbine design indicate significant possibilities for the future and emphasize the need for specialized technical studies and the discovery of new techniques required in the construction of machines operating at extremely high speed, high temperature, and high compression. The Institute's new laboratory, which is to be completed as soon as possible, will undertake such a program. Its equipment will include a supersonic wind tunnel and unique facilities for research on the elements of compressors, combustion devices, jets, and gas turbines. Test facilities will also be provided for the operation under controlled conditions of such devices.

The gas turbine was applied with spectacular success in jet-propelled aircraft and is considered one of the most important technical developments to emerge from the war. As a power plant it holds great promise for many other transportation and industrial uses.

In announcing plans for the turbine laboratory, Dr. Hunsaker said:

Recognizing the importance of the field and the need for immediate work both in research and in the training of young engineers, the Institute established a Faculty committee representing aeronautical, mechanical, metallurgical, and chemical engineers to investigate the present status and future potentialities of gas turbines. The report of that committee was emphatic on one point: that the gas turbine field must be recognized as

* Of Westinghouse Electric Corporation.

one of the most important objects of study in mechanical engineering.

Because gas turbine design problems embody the entire range of mechanical engineering science, the subject can also be a focus for research in the aerodynamics of the flow of gases under compression, including the design of variable jets, combustion, materials to resist high temperatures, and many other topics.

The Visiting Committee on Aeronautical Engineering under the leadership of Gordon S. Rentschler made arrangements for financing the project, the early realization of which is made possible by substantial grants from a group of leading industries, all of which will benefit from fundamental research on gas turbines. Those contributing to the program include Alfred P. Sloan, Jr., '95, chairman of the board of General Motors Corporation and a life member of the Corporation; the General Electric Company; the Westinghouse Electric Corporation; the United Aircraft Corporation; the Hooven, Owens and Rentschler Company; and the Curtiss-Wright Corporation. Professor Edward S. Taylor, '24, is project engineer for the laboratory, and the firm of Jackson and Moreland are consultants.

The future possibilities for gas turbines extend into many fields, some of which cannot yet be foreseen. It is believed they will revolutionize air, marine, and land transportation, for, properly developed, they will have important advantages over present types of power plants.

Restaurant Sanitation Refined

WITH the transfer of the United States from a peacetime to a wartime basis in December, 1941, the Institute, like many other educational institutions, found itself confronted with a large program of wartime teaching and research. By the end of 1943, there were approximately 1,200 men receiving instruction in the Army Specialized Training Program, 900 enrolled in the Navy's V-12 unit, and 1,500 in civilian engineering (*Continued on page 66*)



The green light in metals... Revere has them NOW

Revere knows well how precious to the nation each of these post-war days can be, and how crippling to industry and employment could be a shortage of essential metals. That is why, since V-J Day, Revere has been in full production for peace.

Fortunately, Revere metals can serve the needs of creating as well as those of destroying, can make as fine bathroom fixtures as bomb fuses, as excellent radiators for automobiles as for half-tracks. No difficult reconversion problems have stifled the outpouring of Revere metals.

Revere copper, brass, bronze, aluminum, magnesium, steel, are ready *now*, are already busy in thousands of plants helping shorten the period of reconversion for industry and for the nation.

We are able and eager to do more. One inevitable result of Revere's war effort has been that not only our ability to produce, but our ability to give service, have been expanded many times. Revere research has probed further and deeper. Revere Technical Advisors are armed with greater knowledge and experience. New methods, metals and machines may save precious time or cut all-important cost for users of our metals.

In all these ways Revere is ready *now* to serve the manufacturing and building industries to help you prove *immediately* that America is even greater in peace than she proved to be in war. In the same way Revere is ready to serve home owners with its building products which are stocked by Revere Distributors in all parts of the country.

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Sunday evening, 9 to 9:30 P. M.,
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NOW IT CAN BE TOLD

*Accuracy in "Millionths" on Production Job
Obtained on Bryant No. 112 Internal Grinders*

B-29 FUEL INJECTION PUMP PRODUCED BY ECLIPSE

SPRINGFIELD, VERMONT — Another stride by American war production genius was disclosed recently by the Army Air Forces Air Technical Service Command and Eclipse Machine Division of Bendix Aviation Corporation.

Mass production of fuel injection pumps for the B-29 Superfortress has been achieved at the Eclipse plants in Elmira, New York. The Bryant No. 112 Internal Grinder was chosen for the sleeve bushing job, and tech-

nical details for production of this part were worked out through the close cooperation of Eclipse and Bryant engineers.

Production Tolerances Unbelievable

In the hands of Eclipse workers, the Bryant machines are producing parts to diameter tolerances of 10 millionths of an inch or less. This necessitates maintenance of straightness and roundness to even finer tolerances. This infinitesimal de-

gree of precision was graphically demonstrated by Mr. T. W. Tinkham, General Manager of the Eclipse Machine Division. After demonstrating the precise fit between the plunger and the bushing ground on the Bryant machine, Mr. Tinkham had a newsman rub his fingers on the pump piston. The very slight film left by the newsman's fingers was sufficient to make the plunger stick in the bushing.

Improves Bomber Performance

B-29's equipped with the fuel injection pump are flying surer than ever before at extreme altitudes where rarefied atmosphere, varying pressures and sub-zero temperatures must be taken into account. It is interesting to note that the gasoline is the only lubricant used in the pump assembly.

Cooperation Plus Secrecy

This is a typical example of the way Bryant men have cooperated with the engineers of our leading manufacturers during the war years. This is one example, but hundreds of others still must remain on the secret list. Now, when you are planning for a peacetime production there still is a Bryant man ready to assist you.



(Photo Courtesy Eclipse Machine Division)

MACHINES THAT DO THE JOB. This is part of the group of over a hundred Bryant internal grinders at Eclipse Machine Division, Bendix Aviation Corporation, Elmira, New York. These machines are grinding sleeve bushings to a tolerance of 10 millionths or less.



BRYANT CHUCKING GRINDER COMPANY

**SPRINGFIELD
VERMONT, U.S.A.**



Here's one way to Look at it...

It's not a bad idea to delve into the future of your heating system. If your system is supplying inadequate, indefinite heat, you may be wasting valuable fuel. It's up to you: correct the cause—or continue the discomfort.

A simple matter of modernization with the Webster Moderator System and Webster Automatic Controls—and you'll see a completely different picture... A heating system that supplies heat when you want it, where you want it, and in the amount necessary for health and comfort.

With the Webster Moderator System of Steam Heating you get adequate, uniform temperatures

at all times. No overheating. No underheating. No costly waste of fuel. Steam delivery to each radiator is automatically "Controlled-by-the-weather" to agree with every change in outdoor temperature.

More Heat with Less Fuel

Seven out of ten large buildings in America (many less than ten years old) can get up to 33 per cent more heat out of the fuel consumed! ... A book "Performance Facts" gives case studies—*before and after* figures—on 268 Webster Steam Heating installations. Write for it today. Address Dept. TR-11.

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Pioneers of the Vacuum System of Steam Heating : : Est. 1888
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The Webster Outdoor Thermostat automatically changes heating rate when outdoor temperature changes.



AUTOMATIC
Webster
Steam Heating

READ THE LATEST NEWS!...

About IRC Type BT and BW RESISTORS

Here's a brand new file size Engineering Bulletin, just off the press! It offers you essential authentic information on IRC Type BT (Insulated Metallized) and BW (Insulated Wire Wound) Resistors. Concise, easy-to-read and an excellent ready-reference source, it contains eight pages of "meaty" material that will save you valuable time by quickly answering many of your resistance problems. Interesting construction facts, characteristics data, JAN Type Numbers, dimensional drawings, as well as a complete list of resistance values are compactly presented in this new BT-BW Bulletin. It should be in every Engineering and Design file. Write for your copy today. Address Dept. 11-K.



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IRC makes more types of resistance units, in more shapes, for more applications than any other manufacturer in the world.

FOR THE REFINER Who Must Develop Economical, Competitive Refining Operations With War-Time Facilities ...
FOR THE REFINER Who Must Install Modern Facilities To Meet Post-War Competition ...

"Petroleum Refining Processes" — ninth of a series of annual brochures by Lummus — is now available. Containing data on a number of war-developed processes and combinations of processes, and supplemented by flow diagrams and photographs, "Petroleum Refining Processes" should be of interest to the refiner who is considering the adaptation of war-time facilities or the installation of new units to meet post-war competition.

Copies of "Petroleum Refining Processes" will be sent upon request.

THE LUMMUS COMPANY

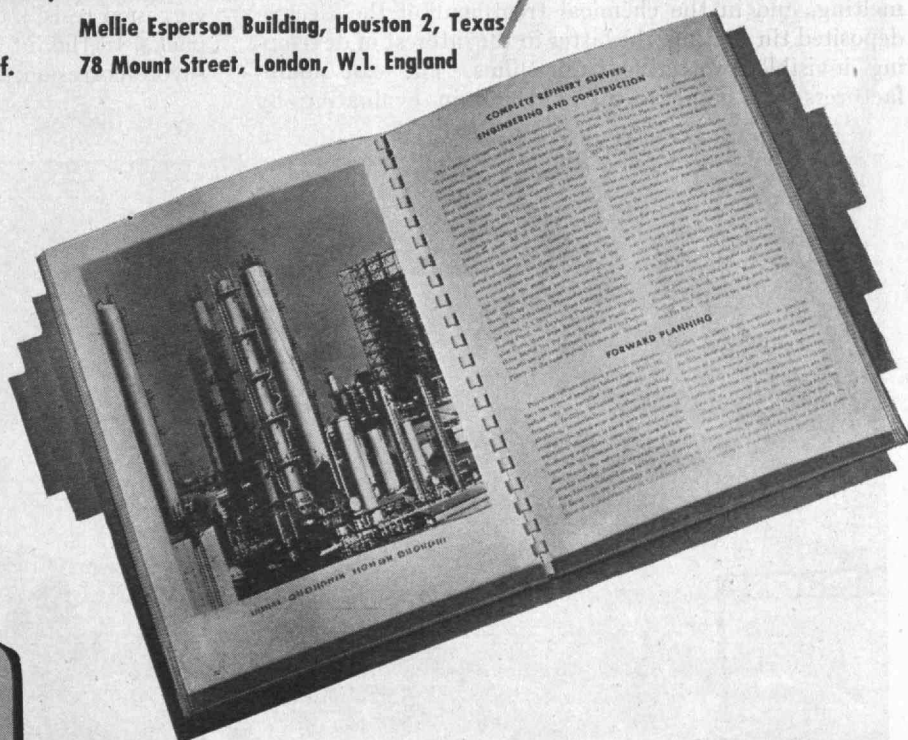
420 Lexington Avenue, New York 17, N. Y.

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Lummus
PETROLEUM REFINING PLANTS

FACE LIFTING FOR TIN CANS

(Continued from page 38)

A horizontal system for deposition is used in other acid lines. When electrolytic tin plate reaches a standardized level of quality, the possibility of better and more compact design of lines and the more efficient operating characteristics of the acid electrolyte may offer serious economic obstacles to the more complicated alkaline process.

After the melting of electrodeposited tin, it was thought the dense fused tin from all electrolytes would have identical properties. This belief has not been realized although increased knowledge of surface effects may eventually bring it about. As a result, differences in the adherence of enamel or lacquer and in corrosion resistance under specific conditions are reported between plate-carrying tin deposited from acid and that coated by the alkaline process. With further knowledge of the all-important surface condition of not only the electrodeposited and melted tin but also the peculiar and sensitive surface of the steel strip before electrodeposition, it is the opinion of many in the industry that the erratic variations in quality may be eliminated. It is a fact that some test lots of plate from both electrolytes have given service as good as or better than that of conventional hot-dipped tin plate. Intensive studies are being made of all variants in the preparation of the steel strip, in the melting, and in the chemical treatment of the electrodeposited tin coating, the latter in the interest of developing invisible protective oxide films. The can manufacturers are doing a splendid job in evaluating by

actual packing tests the experimental electrolytic plate produced in these studies. Without these efforts the tin-plate industry would be lost, as there is no short test for the service life of a tin can. The time intervals of several months necessary in such testing have required expensive and speculative experimentation by the tin-plate industry as well as the can industry.

The resumption of general-line or dry-pack canning will require much if not all of the installed electrolytic tin-plate capacity. The complete displacement of hot-dipped tin plate in the wet or processed-food packs must await the results of studies now under way for the control and maintenance of high corrosion resistance in electrolytic tin plate. The efficient utilization of electrolytic tin plate will also depend upon the establishment of a minimum number of standard grades. With crop conditions, the seasons, and other variables profoundly affecting demand and inventory, a demand for specialty grades of plate would place a heavy burden upon the industry. The ideal situation would require two grades of plate, the one grade carrying an improved melted coating for the severe packs, the other grade carrying a light, unmelted or matte finish coating for the general-line dry packs. For economy, these coatings should be as light as consistent with the requirements. The over-all cost of heavy electrolytic coatings increases much more rapidly than the cost of the additional tin. If a 0.5 pound electrolytic coating can be stabilized at the higher levels of corrosion resistance, it might serve generally for the wet packs. In the interest of economy and in the absence of severe corrosion, the general-line plate should be estab-

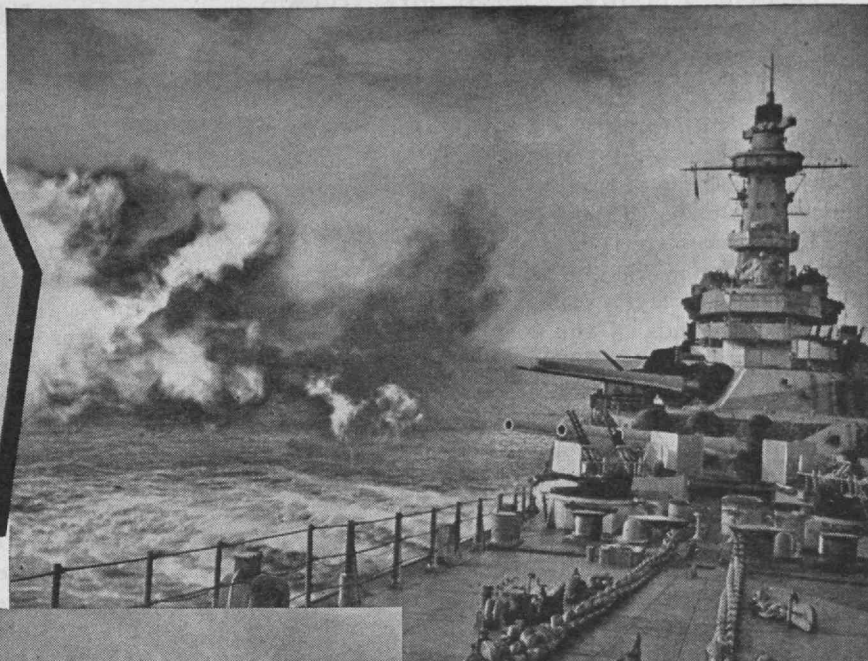
(Concluded on page 54)



P O O R & C O M P A N Y
CHICAGO

Manufacturers of Railway Equipment used by Railways throughout the world

All of the Navy's
big guns are
directed by
RADAR made by
Western Electric



U. S. Navy Photo



USAAF Photo-Acme

All bomb-
directing RADARS
used on B-29's
were made by
Western Electric

RADAR made many contributions to Victory both in Europe and in the Pacific. It directed the fire of naval guns—the dropping of bombs through clouds and darkness—detected the approach of enemy planes and ships—spotted submarines—guided night fighter pilots to their unseen targets.

Radar takes scores of weird shapes, each especially developed to do a specific job.

A land-based radar may tip the scales at 70,000 pounds. A compact airborne unit may weigh only 168 pounds.

A simple radar may have 80 vacuum tubes—another as many as 374.

One unit may require 40,000 labor hours to complete—another type only 4600 hours.

Up to the end of the war, Western Electric had furnished more than 56,000 radars of 64 different types, valued at almost \$900,000,000.

The basic principles of radar—transmission and reception of high frequency radio waves—have long been familiar to Western Electric through its wide experience in making telephone, radio and other electronic apparatus. So it was natural that this Company was chosen to play a leading role in radar for use on land, aboard ships and in planes.

Buy Victory Bonds and hold them!



Western Electric
NATION'S LARGEST SOURCE OF RADAR



FACE LIFTING FOR TIN CANS

(Concluded from page 52)

lished with a lighter coating of not more than a 0.25 pound. This general-line plate with an unmelted matte finish would have a distinctive silvery appearance suitable for pleasing decorative effects and would replace much black plate with its rust hazard.

Electrolytic plate is now established in the tin-plate industry. During 1944, about 14,000,000 base boxes of 0.5 pound electrolytic plate were produced, conserving 10,000,000 pounds of tin and representing a product with a value of \$60,000,000, a sizable industry in itself. From the inception of the process, it is estimated that about 27,000,000 boxes of electrolytic tin plate have been produced, almost entirely 0.5 pound, with a tin saving of more than 20,000,000 pounds during the important years when our tin reserves were being established. Electrolytic plate represented last year about one-quarter of the total tin-plate production. Now that we are returning to normal peacetime operations, it is clear that electrolytic tin plate will have a permanent place in the future manufacture of metal containers. Expansion in the amount of steel and tin required for tin plate will almost certainly follow, but with the conservations put into effect as a result of the newly developed process, it is possible to produce a better product with a given quantity of tin. A research product, stimulated by the necessity of war, thus begins to offer peacetime benefits.

HOW BEAVERS BUILD

(Continued from page 36)

Beaver dams may be enduring, but this does not controvert the fact that they are built haphazardly. Such durability is attributable to three factors. Every freshet reinforces dams with leaves and twigs carried by the flood. Silt from tributary streams deposits continually; in time this silt almost fills beaver ponds, so that dams, instead of bearing the strain of a considerable head of water, simply form one edge of banks of alluvial soil. Finally, the wood of beaver dams is exceptionally durable. Because the builder has previously dined on its bark, the wood exposed to air is peeled. Peeled wood resists insect attack much longer than does wood with the bark on, as every architect of log cabins knows. Furthermore, wood in submerged portions of dams is preserved by its very submersion; keeping logs in water is the expedient used by lumber operators to save logs which cannot be taken to sawmills the season they are cut.

Beaver lodges are built in much the same random fashion as are dams, although the need for keeping open internal chambers necessitates somewhat more exactitude in lodge construction. Most beaver houses look like roughly domed piles of branches; in fact, the uninformed observer may not identify them for what they are. However, an unusual lodge I found in swamps south of Island Pond shows in a unique way a principle of lodge construction. Some aberration of instinct led the beavers here to

(Concluded on page 56)



FURNACE CONVEYOR MANUFACTURER PROVES EXCELLENCE OF THE
WHS SPEED REDUCER

The performance given by a WHS No. 5B Worm Gear Speed Reducer and electric motor drive led the manufacturer of this "Campion Shuffle Hearth" (a conveyor for transporting work through a heat treating furnace) to standardize on this equipment in place of compressed air.

WHS DEPENDABILITY has been demonstrated for nearly 50 years in over 100 industries. Manufactured by the makers of the "First Speed Reducers in America to be Shipped from Stock."



Cutter P. Davis, M.I.T. '19, President



WINFIELD H. SMITH, Inc.

55 MAY STREET...SPRINGVILLE..ERIE COUNTY..NEW YORK

So you'll be safer

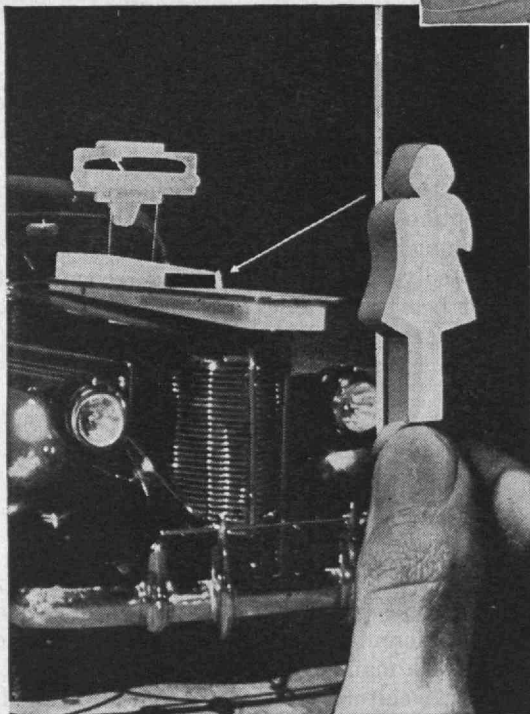


Radar will make travel safer. General Electric scientists are working along these lines. Among many other G-E developments are better street lighting, which reduced night traffic accidents in one city 93 per cent in ten months... a tiny gage which prevents accidents to workers around cranes... a new hay-drying system that helps prevent farm fires caused by storing wet hay.

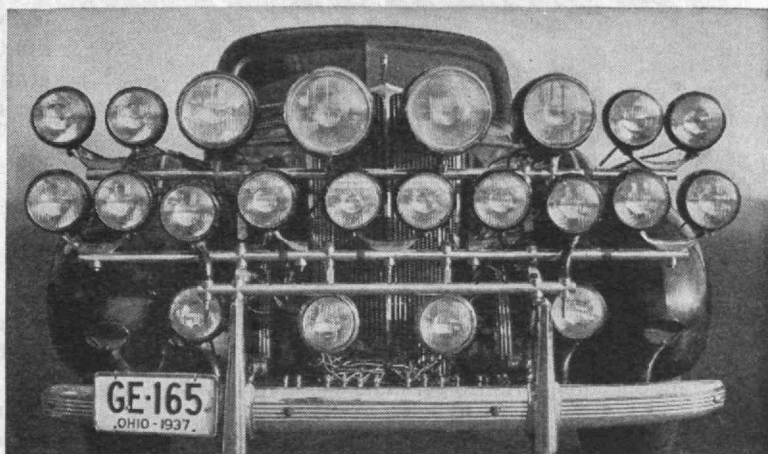
Working on developments such as these, G-E engineers and research scientists are helping to make life safer for you. *General Electric Co., Schenectady, N. Y.*



Radar prevents collision. This actual photograph taken on the bridge of the "American Mariner," U. S. Maritime Service Training Ship, shows General Electric's new peacetime radar Electronic Navigator helping plot a safe course. The officer is looking at the G-E Navigator's radar screen, which shows him the position of the ship and the objects around it. On ships or planes, in fog or darkness, radar will warn pilots of unseen hazards.



2-inch doll saves lives. Central character of an ingenious apparatus to test street lighting is a tiny doll that represents the average pedestrian as seen at a distance. The complicated device measures visibility and glare. It was devised by General Electric engineers to help make streets and highways safer for night driving.



Bug-eyed auto was the car used in development of G-E Sealed Beam headlights adopted by the automobile industry. The Sealed Beam headlights give more and safer light. Tests show that the average G-E Sealed Beam lamp gives 99 per cent as much light near the end of its life as it did when brand new. About 45 lamps of Sealed Beam type have been developed by General Electric for the Army and Navy.

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Permanent Magnets

This unusual Arnold manual on permanent magnets is the product of many months of careful research and planning.

It is devoted entirely to the consideration of the factors affecting the design, fabrication and application of Alnico permanent magnets. Written entirely by Arnold engineers, its purpose is to help engineers in industry to better utilize the magnetic and physical characteristics of the Alnico alloys in arriving at efficient design.

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THE ARNOLD ENGINEERING COMPANY

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Specialists in the Manufacture of ALNICO PERMANENT MAGNETS

HOW BEAVERS BUILD

(Concluded from page 54)

leave their basic timbers several times longer than necessary. As clearly shown by ends projecting through the roof, these foundation sticks were set together in the same fashion as supports of an American Indian tepee are assembled. Additional branches were then piled haphazardly around these supports, and finally earth was added.

In addition to building dams and houses, beavers also dig canals, but among Ramapo Mountain beavers this engineering activity is not spectacular. Here canals are limited to short, shallow ditches in pond shores and appear to have arisen largely by chance. While dragging branches from wooded slopes down to ponds, beavers are guided by resistance of vegetation into following the most open routes. In time, such a route of least resistance becomes well worn, and the shore at its foot develops a groove from scraping action of the dragged wood. Continued use of this route may deepen such a depression in the shore to the extent that it fills with pond water and, to the superficial observer, becomes a canal. Occasionally I have seen evidence that such a channel has been purposefully enlarged by beavers, but none of these ditches seemed capable of facilitating their wood gathering to any significant extent.

Beavers apparently rank no higher in the scale of intelligence than do their fellow forest-dwelling mammals. In spite of their well-known activities in the construction of lodges and dams, it can hardly be said that these structures are the outcome of intelligent design or planning. The beaver's unique constructive activities seem to be governed by fixed instinctive behavior patterns, which sometimes lead them into difficulties by making no allowance for exceptional conditions. Some of these have already been enumerated above, and additional examples could undoubtedly be cited. But having recognized the limitations of beaver activities, we must, nevertheless, grant that these animals richly merit their repute as *the* engineers of the animal kingdom.

PRIMITIVE MEDICINE

(Concluded from page 30)

Different degrees of medicine men are recognized, according to the type of initiation they have undergone, and there are different types of specialists in the various disorders to which man is heir.

In many other cultures a person becomes qualified to treat a disease by virtue of the fact that he himself has recovered from that disease. In Africa a man may become a doctor by apprenticing himself, for several years and at an appreciable fee, to an already established medicine man, who then teaches him what he should know. A graduate medicine man may go in for postgraduate work by purchasing still higher secrets from others whose practice has brought them great renown. It may be noted here that the method of becoming a doctor by apprenticeship lasted well down into the middle of the 19th Century, continuing long after medical schools were established. Thus, it will be perceived that "primitive medicine" and "primitive doctors" bear more than a family likeness to our own.

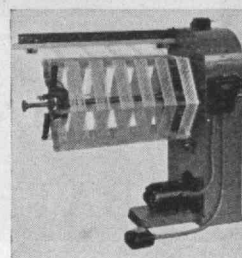


*** SYMBOL**

Wind, Spool or Skein more and faster with **FIDELITY MACHINES**

Illustrated is only one of a number of widely different machines. . . . Among the FIDELITY SKEIN REELERS the one illustrated is only one of a range of skein reelers—all of which, however, operate faster, require less floor space and have a notably low power cost per pound of yarn handled. Savings in man hours and reduction of fatiguing operations contribute a bonus that goes beyond the immediately tangible dollar savings—although these, of themselves, are substantial.

Whatever your winding, spooling or skein reeling problem, a good point to begin inquiry is at FIDELITY Machine Company.



*
Ancient bronze lion in front of the Alfred O. Deshong Museum, Chester, Pa.—considered one of the finest examples in North America of this form of early Chinese art. It symbolizes fidelity and steadfastness.



MANUFACTURERS OF CIRCULAR KNITTING MACHINES

BUILDERS OF AUTOMATIC PRECISION MACHINES



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Laboratory
Work**

AS WELL AS PRODUCTION PRESSURE

Under pressure of war production new demands were successfully met by Liquid's laboratory staff. From inert atmospheres as a fire precaution, to solidifying lubricants for stratosphere shipment, a great expansion was made in the range of solid and liquid gas applications.

Some of these developments — or those made in your own laboratories when checked by our experience — may be important to your current plans. We shall be glad to send or exchange information.

Prewar and Postwar Products
Beverage Bottling Machinery • Labeling Machinery • Fountains and Refrigerated Dispensing Equipment • Welding Equipment • Extracts and Flavors

**COMMERCIAL GASES**

Carbon Dioxide (CO₂)
Dry Ice
Oxygen
Acetylene
Hydrogen
Nitrogen

MEDICAL GASES

Ethylene, Oxygen, Helium
Helium-Oxygen Mixtures
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BATH IRON WORKS CORPORATION

*Shipbuilders and
Engineers*

BATH, MAINE

EDUCATED MACHINERY*(Continued from page 34)*

substitute more versatile types. If the last A-tape introduced cannot find a sufficient number of units of the right types available, a signal system indicates the nature of the difficulty and that problem is withdrawn until there is room for it.

Provision is also made for keeping track of the identities of the various units. This is primarily necessary so that the values of gear ratios and initial conditions, supplied on B- and C-tapes, are routed to the proper equipment. For this purpose, a serial number is assigned to each problem and is punched at the beginning of every tape associated with that problem. The units used in any problem are identified by a type number and then are given arbitrary serial numbers, starting at "one" for each type of unit. The combination of problem serial number, unit type number, and unit serial number completely describes to the machine the destination of any information supplied on the B- and C-tape.

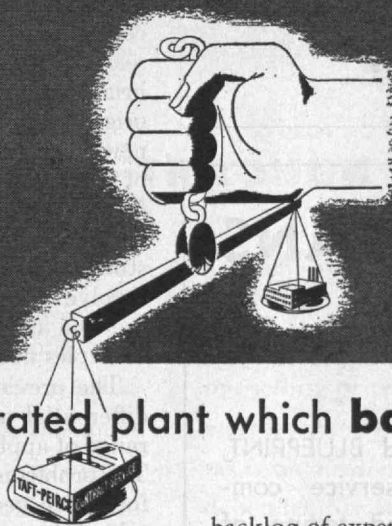
These features were included in order that the new differential analyzer might have the flexibility it needed to serve science to the best advantage. For the most part, the economy of using a differential analyzer has been apparent without detailed accounting. Its speed frequently justified work on problems which otherwise could be done only at prohibitive cost. But there was an economic limitation on the use of the older type of machine because of the time required to assemble the mechanical interconnections. A machine of this type could not render effective aid to the user if the number of solutions required was so small that the time used to assemble the machine was comparable with the time required for numerical calculation. Even when the quantity of work justified the use of the machine, it was a rare problem that could be handled in one continuous operation without stopping occasionally to study current results and plan the next steps.

Another strong reason for the inclusion of many of the automatic features of the new differential analyzer was to relieve the operator of the machine of the necessity of paying attention to the multitude of details that must be attended to in order to set up a problem and carry its solution through to a conclusion. The operator should be able to devote as high a percentage of his time as possible to the engineering and mathematical aspects of the work; he should be expected to perform only those tasks requiring the exercise of judgment and not tasks which represent constant attention to mechanical details. The operator of the new differential analyzer is thus enabled to direct his energy toward securing end results, and, in practice, a notable increase in the productivity of the combination of machine and operator has been apparent.

The new differential analyzer is specifically adapted to permit intermittent operation on a problem. The punched tapes are kept on file, and it is only a matter of minutes to reconnect the machine when further solutions are required. Because of the reduction of connection time, it is now feasible to handle also the problem which requires only a few solutions. Thus the scientist using the differential analyzer can arrange a program to suit his own convenience without being concerned with the exigencies of meeting machine operation schedules. He can proceed at whatever pace is indicated by the nature of the problem.

(Concluded on page 60)

For Quick Help in Reconversion



— choose a fully integrated plant which **balances** your own

If you're trying to get a flying start on reconversion—but can't seem to get off the ground—then let the Taft-Peirce Contract Manufacturing Division give you, *right now*, what amounts to a “jet-assisted take off.”

This uniquely flexible plant has the men, mentality, and machines all ready to help you on your job, be it a single tool or part—a complete tooling program—construction of special machines—or continuous mass production of parts or assemblies.

Whatever your product, you will find here a solid

backlog of experience *in many industries*. For Taft-Peirce is no wartime mushroom growth. It is a completely integrated plant which has been building systematically for 75 years toward its present unmatched versatility in experience and equipment for special work.

Whatever you need, whether in tooling or manufacturing, you will find the facilities here to balance your own exactly—and to help you outspeed competition to your new market objectives. Wire or write to The Taft-Peirce Manufacturing Company, Woonsocket, Rhode Island, or telephone Woonsocket 1.

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AIRCRAFT ENGINEERS

After the war, the Beech Aircraft Corporation will keep the same reputation for designing and building outstanding airplanes as it has had before and during the war. In accomplishing this, we offer the opportunity for permanent positions in an expanding organization to men with experience and above average ability on drafting, minor and major layout work, and stress analysis. In applying send complete information on education and experience to:

Engineering Department

BEECH AIRCRAFT CORPORATION
Wichita 1, Kansas

EDUCATED MACHINERY

(Concluded from page 58)

This feature of the new machine carries with it possibilities for enlarged service to science in many directions. In operating the original analyzer the Institute supported a policy of using the machine on any appropriate problem regardless of its source. Although the majority of the work for the machine originated among the staff and students of the Institute, a substantial contribution was made to research at other institutions and to problems of industry. To be most effective, it was generally desirable for the author of a problem to follow the course of the work on the machine and be ready to modify his program as circumstances required. This imposed a residence requirement which could not always be met and consequently which limited the geographic scope of the machine's activity.

The ability to shift problems on and off the machine at will opens for the first time the possibility of rendering effective service to nonresident users. Indeed, during the war there were some instances of rather spectacular exploitation of this feature. When time permits, every step in the machine solution of a differential equation can now be carried out by correspondence. All manipulation of the machine itself is done by a full-time staff in accordance with the stipulated requirements given by the user.

Within the Institute, the new differential analyzer becomes an instrument not only for direct aid to the research activities of all departments but also one which can bring new vitality to the instruction of students. The original machine was used in many thesis studies and the new one can be much more effective for such use. A study of the technique of using the machine is a useful discipline for students in many branches of science and engineering and is a required subject for one group of Navy officers studying at the Institute. The teacher of subjects which involve treatment by means of differential equations may use the machine as the source of specific illustrative examples not otherwise readily available.

The previously given examples of the activity of the differential analyzer are merely indicative of its broad range of applicability and are not a measure of its power. The problems which are brought to the machine are those for which general mathematical solutions cannot be obtained. In such cases, one must resort to the computation of specific numerical solutions. These can be obtained by well-known methods of numerical integration, but even for problems of moderate complexity the computations are tedious and exhausting. The prospective labor is discouraging at the least; it frequently leads to the use of unsatisfactory approximations, and sometimes it renders progress impossible.

In a situation of this sort the opportunity for the machine is great. It can become the tireless ally of man, valued not only because it relieves man of drudgery but also because its readiness to do so liberates man's thinking. The machine in its new design is able to conform to whatever pace may be appropriate to the work in hand, whether dictated by the scientific nature of the problem, or the methods of the individual, or the fact of geographical separation. Although the development of a machine of this sort represents a major engineering achievement, its ultimate value and significance are measured solely by the extent to which it increases man's scientific productivity.

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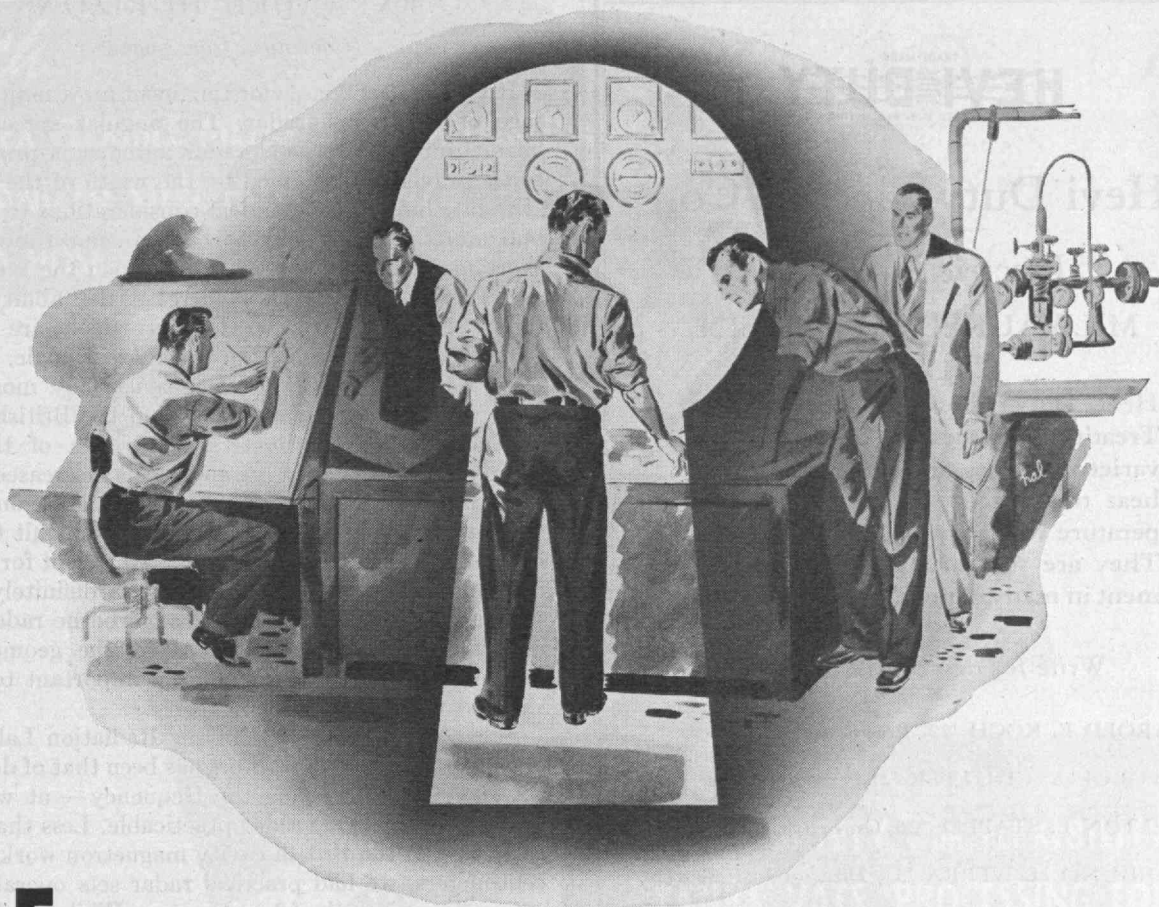
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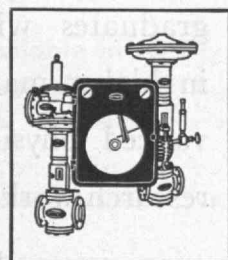
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BRUNO H. WERRA '32, *Director of Research*

EXPANDED HORIZONS

(Continued from page 26)

It is here that we see for the first time a major advantage of microwave radar. The angular spread of the beam from a directional radar antenna is proportional to the wavelength divided by the width of the antenna. If we are limited by practical considerations to a certain maximum antenna dimension (as we almost always are), shortening the wavelength will sharpen the radar beam correspondingly and thus increase the ability of the radar set to distinguish targets which are actually separate, even though close together in angle. In going from 1.5 meters (the wavelength used by most of the long-wave radar with which we and the British entered the war) to 10 centimeters, the width of the beam from an antenna of a given size is decreased fifteen-fold. We must be careful not to let the beam become so sharp that it becomes inordinately difficult to obtain full coverage of the surroundings, but except for this precaution, increased beam sharpness is definitely advantageous. Especially in the case of airborne radar, where antenna size is sharply limited by the geometry and aerodynamics of the airplane, it is important to use the shortest wavelengths practicable.

Since the establishment of the Radiation Laboratory, one of the major lines of effort has been that of decreasing wavelength — increasing the frequency — at which the microwave art made radar practicable. Less than a year after we had the British cavity magnetron working at 10 centimeters, we had practical radar sets operating at a nominal wavelength of 3 centimeters. While this band was exploited in combat, our research teams, working together with British scientists and the electronics industry in this country, were pressing on to shorter and shorter wavelengths. The next was ready for combat use when the war ended.

From the standpoint of the pre-war radio art, 1 meter was a very short wavelength. We are now accustomed to handle, on an everyday, humdrum basis, wavelengths about one-hundredth as great. Of course, when wavelengths got down to about the dimensions of our apparatus, we had to stop thinking of circuits in terms of their lumped constants — resistance, inductance, and capacitance — and develop circuits and ways of thinking which were derived more directly from the basic laws of electrodynamics. Waveguide technique, a laboratory curiosity in 1940, has now become a full-fledged and well-understood branch of engineering.

The extension of the radio spectrum resulting from the development of equipment operating at wavelengths as short as 1.5 centimeters is, in itself, an accomplishment of vast significance. Consider that wavelengths of 1.5 meters represented the practical limit of operation in the fall of 1940 and that this upper limit was extended some hundred times by the summer of 1945. The last five years have thus seen the useful radio spectrum extended by about 2×10^{10} cycles per second. This means that war research has made available for communication purposes almost 200 times as many channels as were previously available for radio communication. Because very high frequency waves are not reflected from the ionosphere, it is possible to obtain more useful communication channels than even this figure indicates, since stations on the same

(Continued on page 64)

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EXPANDED HORIZONS

(Continued from page 62)

frequency can be operated simultaneously in different parts of the country. Furthermore, the development of very high frequencies opens up the feasibility of new kinds of services which were technically impossible or inadvisable at pre-war wavelengths.

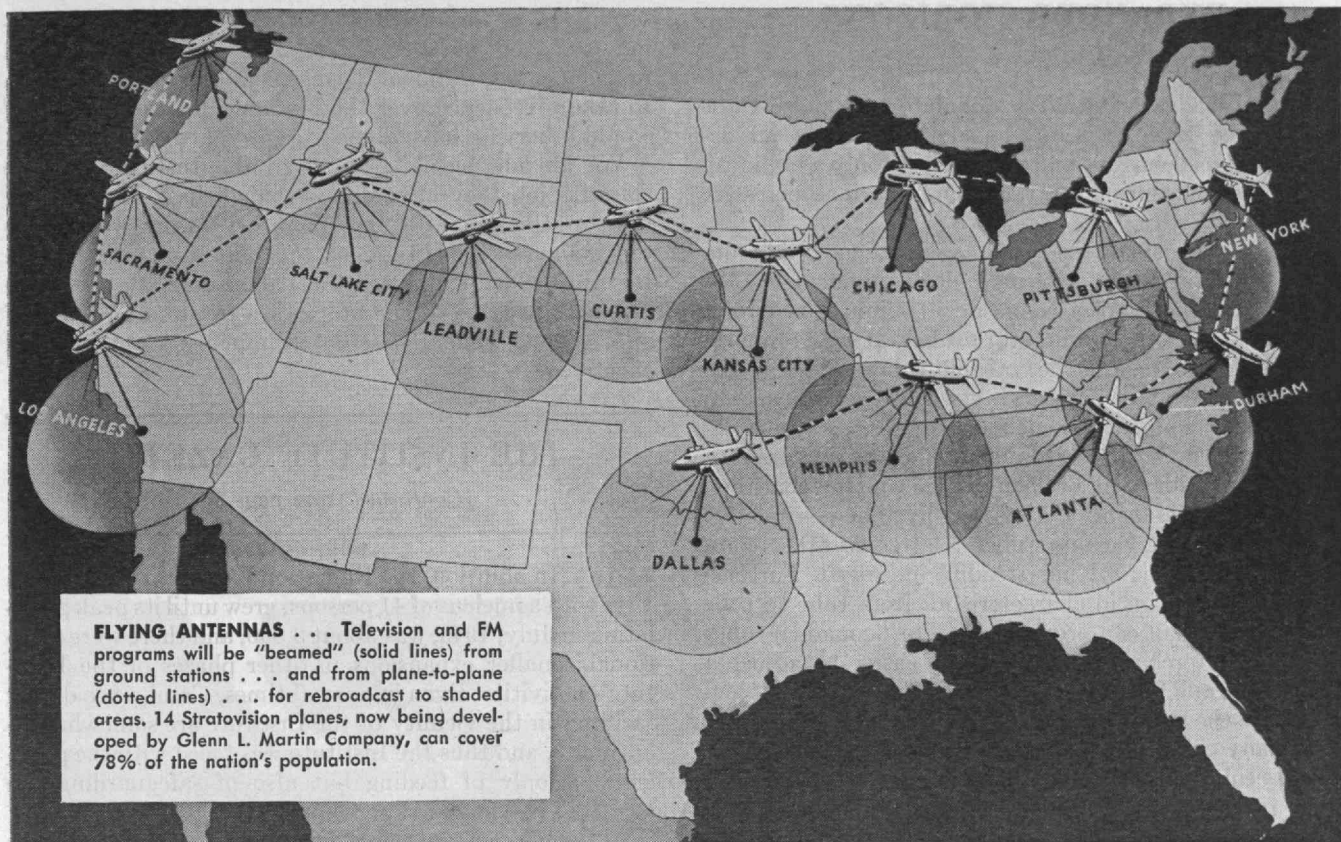
Receivers for the minute echo pulses returned from distant targets had to have as nearly as possible their ultimate sensitivity. In World War I, difficulties of amplifying high-frequency signals led to the invention of the superheterodyne receiver, which seems to be the most satisfactory type of microwave receiver. In the superheterodyne system the received signal is combined with another signal produced within the receiver itself. These two signals beat together to produce a signal of much lower frequency which can then be amplified readily. The success of this system of reception depends upon having a suitable device, called a mixer, capable of producing the low-frequency signal from the two high-frequency signals. Although the development of amplifiers for microwave superheterodyne receivers, and the tubes which made them possible, is a fascinating story with plenty of postwar connotation, it is the development of the microwave mixer which was really spectacular. At the beginning of our work it was known that silicon crystals would function as mixers for microwaves and that vacuum tubes would, too. Neither was very good; crystals were noisy and insensitive, and the tubes had a variety of faults, principally because the length of time it took an electron to travel between the electrodes of a tube was comparable to the period of the microwave signals which were to be received.

The Radiation Laboratory early backed the development of crystal mixers for microwave superheterodyne receivers, as did the British. An enormous amount of work has gone into studies of crystal preparation, processing, and use. As a result we can now build microwave receivers which are as near to realizing their ultimate sensitivity as broadcast receivers can be made. Although we always build microwave receivers with the best sensitivity, broadcast receivers are usually less carefully built simply because static and man-made noise are so bad at broadcast wavelengths that it would not pay to achieve extreme sensitivity. Atmospheric noise is absent at microwave frequencies, and every increase in receiver sensitivity is worth while.

Germanium, as well as silicon, was investigated as a material for mixer crystals. Although the best mixer crystals are still made of silicon, germanium crystals can be made to have almost the properties of an ideal diode over certain ranges of voltage and current. These crystals have been widely used to substitute for diodes as second detectors in superheterodyne receivers and for other applications.

In addition to the greatest possible receiver sensitivity, good radar performance will clearly benefit from the maximum possible transmitted power. Starting with the early British magnetron, we have been able to develop tubes which put out peak powers 400 times as great — 4,000,000 watts instead of 10,000. Magnetron efficiency has risen from about 10 per cent to as high as 80 per cent, and this compares with a figure of about 70 per cent for power

(Concluded on page 66)



FLYING ANTENNAS . . . Television and FM programs will be "beamed" (solid lines) from ground stations . . . and from plane-to-plane (dotted lines) . . . for rebroadcast to shaded areas. 14 Stratovision planes, now being developed by Glenn L. Martin Company, can cover 78% of the nation's population.

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This limits the range of a Television or FM station to a maximum of 50 miles—even when perched atop the tallest building.

A chain of radio-relay stations across the country—or coaxial cables spanning the nation—have been proposed as a solution. But these are terrifically expensive and, worse yet, cause serious distortion of long distance programs.

Now, at last, Westinghouse research engineers have discovered

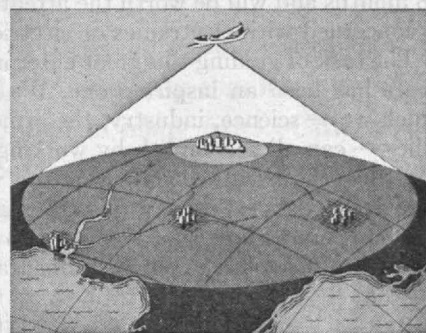
a practical solution through "STRATOVISION"—broadcasting Television and FM programs from planes flying six miles high in the stratosphere!

At this altitude, a single Stratovision plane can cover an area 422 miles in diameter . . . 103,000 square miles . . . approximately the combined area of New York, New Jersey and Pennsylvania.

Westinghouse engineers predict that 14 of these flying broadcasting stations can transmit 4 Television and 5 FM programs simultaneously to 78% of the nation's population.

The conception and planning of Stratovision broadcasting are a tribute to the ingenuity and engineering "know-how" of Westing-

house radio technicians . . . gained through producing \$400,000,000 worth of Radar and radio equipment for our armed forces.



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EXPANDED HORIZONS

(Concluded from page 64)

tubes in broadcast stations. Modulators to pulse these magnetrons have been developed; they apply an accurately shaped current pulse which lasts only a millionth of a second, but during this time hundreds of amperes are delivered.

Emphasis on small size, small weight, and minimum power consumption in airborne radar equipment has led to the development of a whole new technique in circuit construction, using subminiature tubes. It was formerly the practice to regard the vacuum-tube socket as the primary tie point in wiring an electronic circuit and to attach other components, such as fixed resistors and condensers, to the socket terminals. The implication of a socket is that tubes will be changed; this implies that they are interchangeable but are not long-lived or dependable. The reliability of vacuum tubes relative to other components of a radar set has steadily improved. Furthermore, the variation in characteristics from tube to tube means that circuit compromises have to be made if tubes are to be interchanged; it is much easier to adjust a circuit once and for all with certain specific tubes in it and to replace the whole circuit on failure of any part.

In many circuit applications we now use subminiature baseless tubes and wire them into the circuit much as we wired in resistors. Savings in volume, power consumption, and weight are spectacular, and performance need not be sacrificed to make these savings.

Within the compass of this short article, it has not been possible to do more than indicate a few of the many developments of major importance to postwar science and engineering to come out of the wartime work on radar which was so largely centered at M.I.T.'s Radiation Laboratory. As our last major undertaking, we are preparing a series of technical books covering fully these new developments—now that they can be released from wartime security—for the benefit of scientists and engineers generally. These books will appear during the next 18 months and will be worth the attention of anyone who is concerned with electronics or electrical measurements.

The task of guiding this great enterprise during the war years has been an inspiring one. We have learned how much we—science, industry, the armed forces, and our allies—can all accomplish by working together. We are glad that the basic scientific work on which most of the Radiation Laboratory's staff was engaged before 1941 can be resumed now that the war is over; for the hiatus which war has made in our fundamental scientific work is

serious. However important the engineering benefits arising from the work of the laboratory, only their vital urgency to our national defense could have caused them to take precedence over the fundamental work our staff would otherwise have done.

We are all deeply grateful to the Institute for the splendid job they have done in our behalf. In no small measure the success of the laboratory's work was due to the enlightened attitude of the administration of the Institute which supported the Laboratory at every turn and permitted us to operate with a freedom and lack of interference which contributed much to our over-all effectiveness.

THE INSTITUTE GAZETTE

(Continued from page 46)

courses. In addition, the Radiation Laboratory, formed in 1941 with a nucleus of 41 persons, grew until its peak population in July, 1945, was about 3,800, and there were additional, smaller expansions in other phases of the Institute's activities. Even in normal times, Cambridge dining facilities in the vicinity of the Institute are somewhat inadequate, and thus the Institute was faced with the problem not only of feeding but also of safeguarding the health of its expanded personnel.

Although constant effort has long been maintained to assure that sanitary dining facilities and wholesome food are provided at the two dining services under Institute jurisdiction, it was evident that wartime conditions called for even more than usual vigilance at Walker Memorial, where Army students ate, and at the Graduate House, which had been transformed for use by the Navy's V-12 students. Accordingly, these two dining services were placed under expert sanitary supervision, and the program of sanitation and testing which was initiated in November, 1943, has been in constant operation ever since.

Murray P. Horwood, '16, Professor of Sanitary Science in the Department of Civil and Sanitary Engineering, was named to assume responsibility for the program of sanitation and to act as liaison agent between the Army and Navy on one hand and the Institute on the other.

Recognizing that the personnel element was of fundamental importance in the proper preparation and serving of food, attention was first directed to the health and training of personnel employed in the Institute dining halls. All employees are required to be in good health as

(Concluded on page 68)

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THE INSTITUTE GAZETTE

(Concluded from page 66)

determined by comprehensive medical examinations conducted by physicians in the employ of the Institute.

A system of daily inspection by qualified sanitation experts was inaugurated for each dining service. Inspections, carried out while each plant was in operation, were designed to check such items as temperatures of refrigerators, temperatures of wash and rinse water, general sanitation, neatness of personnel, and orderliness of the entire service. Once a month a detailed sanitary survey is made of both Walker Memorial and the Graduate House.

In addition, two kits containing all equipment necessary for taking smears of eating and drinking utensils for bacteriological examination were made available. Samples were collected once every week and were examined at M.I.T. laboratories. Although dairy supplies are obtained from tested cows, samples of milk and cream in use have been examined biweekly for the past two years.

Constant attention was given to every aspect of food sanitation. Put into effect were improved methods of refrigeration, general sanitation, and dishwashing to insure that no dishes or utensils are handled after sterilization except by the user. Attention was given to many matters, seemingly of little importance to some, which had an important bearing on public health. Filleting of all metalware to preclude collection of food particles constituted a part of the program. Food containers are maintained at proper temperature, and trays holding silverware are designed so that only the handles are touched before use. It is believed that the sanitation in the M.I.T. dining halls exceeds that of commercial restaurants.

In carrying out this program, Dr. Horwood examined conditions in many restaurants and a number of Army and Navy mess halls. His report on the program of improved sanitation concludes that the demonstration in food and utensil sanitation which has been carried on for almost two years shows conclusively that the vexing problem of restaurant sanitation can be solved and that public health can be adequately safeguarded by constant attention to all such matters under technical supervision. For a nation that is as travel-minded as the United States and for one that has witnessed such a phenomenal growth of public dining services, this conclusion is of great importance to public health.

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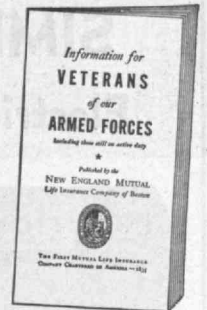
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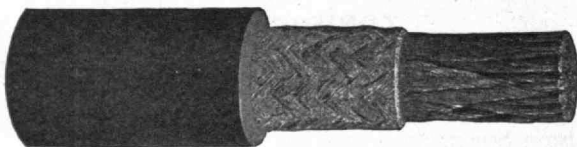
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THE TREND OF AFFAIRS

(Continued from page 22)

coin of poorly engraved design was no credit even to the forger's art, especially with the wide variety of coins in use at the time. To make matters worse, the coming of tokens still further encouraged forgers, for the counterfeiting of tokens entailed little risk under laws which were too lax to control even the more serious forgeries of coins minted by the Crown. It is not surprising, therefore, that apparently almost every new token issued was quickly followed by its illegal double.

Two examples of token coins issued in the last decade of the Eighteenth Century are shown, both of which bear reproductions relating to commercial or manufacturing activities of the times. One of these is an English token coin of 1794, showing four men in a whaleboat. Around the edge of the coin are the words, "Payable at I. Fowler's, London." A London directory of 1795 lists a John Fowler but fails to give his business, and it is possible that the *I* on the coin could stand for a *J*. Fowler may have been interested in some way in the whaling industry, which in 1794 was a big element in English commercialism. On the other hand, the token may be one of the fictitious items struck to appease the fad of collectors of that day.

The second token, dated 1795 and bearing a picture of the Padsole Paper Mill in Maidstone, Kent, is also of halfpenny marking and bears the inscription, "Payable to J. Smyth at Padsole Paper Mill."

The token of the whaling scene is a gift of Allan Forbes and finds a logical resting place in the Forbes' collection in the Institute's Francis Russell Hart Nautical Museum. The token depicting the paper mill was acquired by Dard Hunter and reposes in the Dard Hunter Paper Museum at the Institute.

Mental Milestones

THE rush of events since the appearance of the July issue of *The Review* has left little time to catch up with anything more than the news highlights which followed one another in rapid, staccato succession. But the cessation of hostilities provides opportunity to reflect once more upon the significance of some wartime developments. We may now begin to lift the threads which were dropped on December 7, 1941, and re-educate ourselves in a new world whose pulse has quickened in the last five years.

The developments in the physical sciences, engineering, industrial practices, medicine, and in fact almost all branches of human endeavor will require a mental "brushing-up" process that may last for a number of years. New emphasis has been placed on the need to develop more fully human relations, international cooperation, and true statesmanship. Experience has demonstrated that no matter what form of government holds a nation's reins, it is the common man who is, in the last analysis, responsible for the acts of his public administrators and who suffers most when mismanagement by public officials becomes rampant. It thus becomes increasingly important not only that the public be well

(Continued on page 72)

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THE TREND OF AFFAIRS

(Continued from page 70)

informed of the acts of its government but that it make its voice known constantly on matters affecting public welfare.

During the summer a number of publications have appeared which throw enlightenment on several questions affecting public welfare, publications with which an acquaintance is desirable. The following four of these, all of them well known, are reviewed in these columns: *Science, the Endless Frontier*,¹ *Radar, A Report on Science at War*,² *Atomic Energy for Military Purposes*,³ and *General Education in a Free Society*.⁴

An exceedingly able and forthright presentation is *Science, the Endless Frontier*, by Vannevar Bush, '16, encompassing within 34 pages a survey of this country's present position in science as related to public welfare and presenting a program for renewing scientific man power — a problem rather thoroughly neglected during the war. As reported in the newspapers in August, Dr. Bush recommends the creation of a National Research Foundation to promote scientific research as a function of government, and he outlines the mechanism by which this may be accomplished to produce the most desirable results. Dr. Bush's report is actually a summary of the reports prepared by the medical advisory committee, headed by W. W. Palmer of Columbia University; the committee on science and the public welfare, headed by Isaiah Bowman, President of Johns Hopkins University; the committee on discovery and development of scientific talent, headed by Henry Allen Moe, Secretary-general of the John Simon Guggenheim Memorial Foundation; and the committee on publication of scientific information, headed by Irvin Stewart, Executive Secretary of the Office of Scientific Research and Development. The reports of these four committees are included as appendices in a volume of almost 200 pages.

From its first appearance, *Science, the Endless Frontier* has turned up a mountain of discussion in scientific circles. A good deal of heated debate deals with what has been alluded to as the peacetime regimentation of scientists, and several bills before Congress have served to confuse rather than clarify the issues at stake. But our concern is with the report, several provisions of which deserve special study, particularly since their full significance is of vast importance. Among these are the recommendations that the members of the proposed National Research Foundation have powers and duties "to enter into contracts with or make grants to educational and nonprofit research institutions for support of scientific research"; "to initiate and finance in appropriate agencies, institutions, or organizations, research on problems related to the national defense"; "to initiate and finance in appropriate organizations research projects for which existing facilities are unavailable or inadequate"; and "to estab-

(Continued on page 74)

¹ Washington, D.C.: United States Government Printing Office, 1945. ix + 184 pages. 50¢.

² Washington, D.C.: United States Government Printing Office, 1945. iii + 53 pages. 15¢.

³ Princeton: Princeton University Press, 1945. ix + 264 pages. \$1.25.

⁴ Cambridge: Harvard University Press, 1945. xix + 267 pages. \$2.00.

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THE TREND OF AFFAIRS

(Continued from page 72)

lish scholarships and fellowships in the natural sciences including biology and medicine." However idealistic such proposals may have been intended, one cannot escape the conclusion that acceptance of subsidies of one kind or another detracts from the freedom of the individual or organization subsidized and to the extent of this subduction is potentially antagonistic to true science. Yet it may be difficult to refuse subsidy, especially if the leverage of national defense is applied—and what branch of science is not important to national defense these days? Patriots of the French Revolution could burn the laboratory of Lavoisier and boast that their cause had no need for science, but no modern state may assume that attitude without dire consequences. Yet the mere fact that *Science, the Endless Frontier* has brought forth a variety of questions for vigorous discussion is indication that it strikes at a fundamental problem in our present era. For this very reason, if for no other, it deserves to be widely read.

Radar, A Report on Science at War, released by the Joint Board on Scientific Information Policy, is primarily a discussion of some of the historical background associated with the early development of radar systems and equipment, a recital of some of the more important tactical uses of radar, and (in the appendix) a brief outline of the principles of radar operation for the lay reader. This report attempts to answer the question of the discovery of radar by pointing out, quite successfully

it appears, that such developments are evolved rather than invented. In spite of the complexity of the technical aspects of the subject, this report is straightforward reading, although one not versed in radar terminology will be willing to dispense with a reasonably liberal sprinkling of alphabetical abbreviations. Nevertheless, the exposition of the military uses of radar in the battle of Britain, in the Normandy invasion, and in the battle of the Coral Sea makes the type of reading from which fiction stories and motion pictures might easily, and probably will, emerge.

The official report of the development of the atomic bomb is Henry de Wolf Smyth's *Atomic Energy for Military Purposes*. The preface of this work states:

... The average citizen cannot be expected to understand clearly how an atomic bomb is constructed or how it works but there is in this country a substantial group of engineers and scientific men who can understand such things and who can explain the potentialities of atomic bombs to their fellow citizens. The present report is written for this professional group and is a matter-of-fact, general account of work in the United States since 1939 aimed at the production of such bombs. . . .

It cannot be said that Professor Smyth's report is particularly easy reading, partly because the security restrictions have only been slightly eased, but more so because the report skips around the country taking up those phases of the project which can be related, without indicating with sufficient clarity the relative importance of the different subdivisions of the Manhattan District project. The vast magnitude of the undertaking, the dispersion of research and manufacturing centers, and the need for restricting a good deal of information make

(Continued on page 76)

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THE TREND OF AFFAIRS

(Continued from page 74)

Professor Smyth's task such a difficult one that the author cannot justly be blamed for the shortcomings of this report. Professor Smyth has made a valliant attempt to make the most of a trying assignment. So far as is possible the topics are treated chronologically, and each chapter has a summary which serves the reader as an oasis of orientation.

Nevertheless, a casual, as contrasted to a studied, reading leaves the reader with a motley assortment of general impressions rather than with a clear-cut comprehension of the development of the atomic bomb, and this is unfortunate in view of the importance of the subject.

Aside from the technical and administrative topics which comprise the major portion of the work, two messages stand out in the Smyth report. One of these demonstrates the confidence and success with which nuclear physicists are now able to extrapolate their theoretical work, and the other has to do with the social significance of the bomb. We can do no better than to quote, in both instances, from the Smyth report itself.

[By the end of 1942] a total of 500 micrograms of plutonium was made with the cyclotron and separated chemically from the uranium and fission products. Enough was learned of the chemistry of plutonium to indicate the possibility of separation on a relatively large scale. . . . Enough experimenting and planning were done to delineate the problems to be encountered in constructing and operating a large-scale production plant. . . . A specific program was drawn up for the construction of pilot and production plants. This program presented time and cost estimates.

All this was on the basis of 500 micrograms of plutonium! The report states further:

As regards the plutonium separation work, which was equally important, it was necessary to draw plans for an extraction and purification plant which would separate some grams a day of plutonium from some tons of uranium, and such planning had to be based on information obtained by microchemical studies involving only half a milligram of plutonium. To be sure, there was information available for the design of the large-scale pile and separation plant from auxiliary experiments and from large-scale studies of separation processes using uranium as a stand-in for plutonium, but even so the proposed extrapolations both as to chain-reacting piles and as to separation processes were staggering. In peacetime no engineer or scientist in his right mind would consider making such a magnification in a single stage, and even in wartime only the possibility of achieving tremendously important results could justify it.

Finally the report ends with questions which are put before the people of this country:

We find ourselves with an explosive which is far from completely perfected. Yet the future possibilities of such explosives are appalling, and their effects on future wars and international affairs are of fundamental importance. Here is a new tool for mankind, a tool of unimaginable destructive power. Its development raises many questions that must be answered in the near future.

Because of the restrictions of military security there has been no chance for the Congress or the people to debate such questions. They have been seriously considered by all concerned and vigorously debated among the scientists, and the

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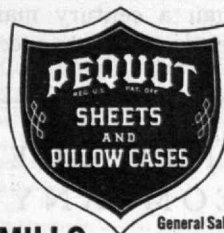
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THE TREND OF AFFAIRS

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conclusions reached have been passed along to the highest authorities. These questions are not technical questions; they are political and social questions, and the answers given to them may affect all mankind for generations. In thinking about them the men on the project have been thinking as citizens of the United States vitally interested in the welfare of the human race. It has been their duty and that of the responsible high government officials who were informed to look beyond the limits of the present war and its weapons to the ultimate implications of these discoveries. This was a heavy responsibility. In a free country like ours, such questions should be debated by the people and decisions must be made by the people through their representatives. This is one reason for the release of this report. It is a semi-technical report which it is hoped men of science in this country can use to help their fellow citizens in reaching wise decisions. The people of the country must be informed if they are to discharge their responsibilities wisely.

In the writing of this report, Professor Smyth has well discharged his responsibility.

The painstakingly compiled report on Harvard, *General Education in a Free Society*, prepared by the committee on the objectives of a general education in a free society, gives the opinion of many noted educators as regards the future education of our youths. At last it has been agreed that the elective educational system of President Eliot has become outdated.

Our technological developments have won global wars, but will these developments keep step with the preserving of the peace? To effectuate this most important phase of our lives, the report, officially addressed to President Conant but unofficially addressed to every thinking American, stresses the necessity of "education for an informed responsible life in our society."

The report points out that education in the United States for more than a century manifested itself by mobilizing the student's mind into specialized knowledge

in the variegated fields of technology. That vocational and technological training must be continued is acknowledged by the writers of the report, but the need for general education, heretofore tolerated and labeled "mere" education, and including the humanities, history, the social sciences and the like, is emphasized for every student. Man, trained in broader fields of learning, will be able to recognize human values and deport himself accordingly. The acquisition of "common standards and common purpose" will give man the necessary equipment to understand his fellow men.

Atomic Acquaintances

SINCE the first atomic bomb exploded over the semi-desert lands near Alamogordo, N. M., on July 16, the Institute has had many requests for textbooks discussing the fundamentals of atomic physics. The following list contains references which lead to an understanding of the structure of the atom and of nuclear fission but which are, for the most part, not so advanced as to be of interest only to the specialist:

K. K. Darrow, "Beginnings of Nuclear Physics," *Proceedings of the National Electronics Conference, 1944*, 479-88.

K. K. Darrow, "Nuclear Fission," *The Bell System Technical Journal*, XL (1940), 1-29.

E. Pollard and W. L. Davidson, *Applied Nuclear Physics* (New York: John Wiley and Sons, Inc., 1942), vii + 249, \$2.75.

F. K. Richtmyer and E. H. Kennard, *Introduction to Modern Physics* (New York: McGraw-Hill Book Company, Inc., third edition, 1942), xv + 723 pages, \$5.00.

H. de W. Smyth, *Atomic Energy for Military Purposes* (Princeton: Princeton University Press, 1945), ix + 264 pages, paper edition, \$1.25, cloth edition, \$2.00. Also available from the Government Printing Office, 35¢.

A. K. Solomon, *Why Smash Atoms?* (Cambridge: Harvard University Press, 1940), xii + 174 pages, \$2.50.

J. D. Stranathan, *The "Particles" of Modern Physics* (Philadelphia: The Blakiston Company, 1942), xvi + 571 pages, \$4.00.

L. A. Turner, "Nuclear Fission," *Reviews of Modern Physics*, XII (1940), 1-29.

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THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

The Cost of War

Dr. Compton's annual report for 1945 is a record of the Institute's war service. You may have already received it by the time this issue of *The Review* appears. You will read it with interest and pride. The accomplishments of the past five years are so absorbing, however, that you may not give one paragraph the attention it warrants. It is worth noting again:

“... the war cost the Institute money. This contribution was made freely and gladly and was entirely proper, since the war was costly to the entire nation and to every patriotic element in it. Furthermore, it was in line with the obligation of such an institution to render public service. No service could be higher than meeting a challenge to the existence of the republic.”

Note further that this was avoidable. The Institute could have made money from the war. How? President Compton outlines the manner in which it might have been accomplished:

“If M.I.T. had set out to make a financial profit from the war, it would have accepted no war contracts at all. It would have urged and assisted its staff to secure outside paying war jobs. It would have kept only enough teaching and administrative staff to handle the reduced group of tuition-paying civilian students. It would have laid up as annual profits a substantial portion of its income from endowment. Its president would have spent the war years in raising gifts from Alumni and friends and in soliciting contributions from the busy, highly taxed corporations.”

Such a course would have been unthinkable. No single group would have condemned it more than we, the Alumni. Through the medium of the Alumni Fund we have an opportunity to demonstrate our appreciation, to evidence our faith in the Institute's future, and to assist in repaying the losses incurred in line of duty.

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to October 1 over 8,776 Institute Alumni, including 35 Admirals, 8 Commodores, and 92 Generals, were recorded as being in the active naval or military services of the United Nations. Among the new promotions to be reported are Rear Adm. Frederick W. Pennoyer, Jr. '20, and Brig. Gen. John H. Stokes, Jr. '25. There were 211 Alumni who had been decorated, and 148 who had made the supreme sacrifice.

With its issue dated November, 1942, The Technology Review began publishing "M.I.T. MEN AT WAR." Although hostilities have ended, The Review plans to continue this page for the next several months in order to record information on M.I.T. men in the services which, to date, has been impossible to obtain. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to cooperate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

- 1904 *Bakewell, Joseph H., C.W.O., U.S.A., Legion of Merit.
1913 Smith, Edward H., Rear Adm., U.S.N., Distinguished Service Medal.
1918 Wheeler, Herbert B., Col., U.S.A., Legion of Merit.
1920 Pennoyer, Frederick W., Jr., Rear Adm., U.S.N., Purple Heart.
Whitten, Lyman P., Brig. Gen., U.S.A., Bronze Star.
1921 Loper, Herbert B., Brig. Gen., U.S.A., Legion of Merit.
Quinton, Alfred B., Jr., Brig. Gen., U.S.A., Legion of Merit.
1922 Hoge, William M., Brig. Gen., U.S.A., Distinguished Service Medal.
Silverman, Abraham G., Col., U.S.A., Legion of Merit.
1924 *Royal, Forrest B., Rear Adm., U.S.N., Distinguished Service Medal.
1925 Sachs, Henry N., Lt. Col., U.S.A., Legion of Merit; Silver Star.
1928 Maguire, Charles J., Capt., U.S.N., Legion of Merit.
1930 Hertzka, Wayne S., Lt. Col., U.S.A., Legion of Merit.
1931 Eekstrom, Clarence E., Capt., U.S.N., Navy Cross.
1932 Bridgman, Minot R. S., Lt. Col., U.S.A., Bronze Star.
*Burr, Leland M., Jr., Lt. Comdr., U.S.N., Navy Cross, posthumously — for extraordinary heroism while serving aboard the U.S.S. Calloway, when that vessel was struck by a Japanese plane off the coast of Luzon.
1934 Keatley, John H., Comdr., U.S.N., Bronze Star.
Quinn, Horace A., Col., U.S.A., Legion of Merit.
1935 Epstein, Leo F., Capt., U.S.A., Bronze Star.
Lincoln, Rush B., Jr., Col., U.S.A., Legion of Merit.
1936 Easton, John A., Jr., Capt., U.S.A., Bronze Star.
Maximoff, Boris S., Maj., U.S.A., Bronze Star.
1937 Garber, Alvin J., 1st Lt., U.S.A., Air Medal.
Weyher, Theodore A., Col., U.S.A., Legion of Merit.
1939 Usher, Edward M., Maj., U.S.A., Bronze Star.
1940 Robbins, Asher B., Jr., Col., U.S.A., Bronze Star.
Weinbrenner, George R., Lt. Col., U.S.A., Air Medal; Purple Heart; Croix de Guerre.
1942 Aschaffenburg, Hans W., Pfc., U.S.A., Bronze Star and Oak Leaf Cluster.
Larkin, James J., Capt., U.S.A., Silver Star.
Stewart, Pearson H., Lt., U.S.N., Bronze Star.
Wengenroth, Reece H., Capt., U.S.A., Silver Star; Purple Heart.
1943 del Valle, Angel A., 1st Lt., U.S.A., Silver Star.
Halligan, James E., Jr., Comdr., U.S.N., Bronze Star.
Lydotes, George A., 1st Lt., U.S.A., Air Medal; Distinguished Flying Cross.
2-44 Van Valen, Maxwell, 1st Lt., U.S.A., Air Medal.
Wagman, Joel L., 1st Lt., U.S.A., Purple Heart.
Wiggins, Richard F., Capt., U.S.A., Air Medal and Oak Leaf Cluster.
10-44 Donahue, Joseph M., Lt., U.S.A., Air Medal and 7 Oak Leaf Clusters.

NEW LISTINGS

U.S.A.

- 1904 *Bakewell, Joseph H., C.W.O.
1911 Proctor, John A., Lt. Col.
1922 Patrick, Samuel, Jr., Maj.
1929 Harris, Carl W., Capt.
1934 *Castle, Robert D.
Levine, Raymond S., Lt.
McDonald, Milton G., Lt.
Nahas, Reginald J., Capt.
1935 Doucette, Joseph E., Pfc.
Gilbart, Arthur W., Capt.
1936 Nyhen, Eoin M., Maj.
Weaver, Halsey A., Capt.
1937 Downs, John A., Lt.
Dana, Joseph K., Capt.
1939 Mazur, Joseph G., Capt.
Minorsky, Vladimir U., Pfc.
Ryder, Charles T., Jr., 1st Lt.
Sheinkopf, Seymour J., Pfc.
1940 Norton, Augustus F., Jr., Pfc.
1941 Smith, Robert E., Capt.
1942 Blakeslee, Harry N., Jr., Pfc.
Jaffe, Harold L., Sgt.
Verrochi, Guido J., Capt.
Wormser, Eric M., Pfc.
1943 Pressel, Paul L., Pfc.
Strohmeyer, William E., Jr., O.C.
Wilkie, Lloyd E., Lt.
Yagi, Fumio, Sgt.
2-46 Hand, Peter C., Pfc.
10-46 Ammer, Dean S., Pfc.
Brettler, Leon J., Pfc.
Dalton, Henry A., Pfc.
Ellis, Robert H., Jr., A.C.
Harian, Joseph M., Jr., Pfc.
Scott, Wellington F., 3d, Pfc.
2-47 Cremens, Walter S., Pfc.
Dorfman, Richard J., A.C.
Fell, Thomas T., Pfc.
Ledebur, Lawrence F., Pfc.
Prytherch, Kenneth M., Pfc.
Quinlan, Ralph L., Pfc.

U.S.N.

- 1923 Fell, Norbert H., Comdr.
1924 Metcalf, James L., Lt.
Muckenhaupt, Carl F., Lt. Comdr.
1928 Martini, Paul J., Lt. Comdr.
1933 Cashman, John J., Jr., Lt.
Witt, Myron J., Lt.
1934 Bjorn, Warren A., S.1c.
1935 Brown, Richard R., Ens.
1938 Martin, Geoffrey M., Lt.
1939 Pulver, William F., S.1c.
Schachman, Howard K., Ens.
Sternberg, Robert V., S.1c.
1942 Alexanderson, Paul A., Jr., Ens.
Dogen, Daniel J., S.1c.
Morse, William H., Rd.M.3c.
Stevens, Herbert W., Lt.
1943 Foulks, William S., Jr., Ens.
Poor, Leonard F., Lt.(j.g.)
Richmond, Robert P., S.1c.
Shairman, Alvin H., Ens.
Wells, Walter G., R.T.3c.
Wilbour, Benjamin F., Jr., S.1c.
2-44 Johnson, Jerald O., S.1c.
MacDonald, James R., Ens.
Paul, Charles P., S.1c.
10-44 Buccini, Angelo R., Ens.
Oakley, Wilbur J., Ens.
Quattrochi, Peter L., R.T.3c.
Russell, Douglas D., Ens.
1943 Smith, George W., Jr., Ens.
Altenburg, Otto A., A.S.
Armstrong, George M., Jr., A.S.
Atwood, John O., A.S.
Battin, Richard H., A.S.
Berman, George M., A.S.
Bickford, George H., A.S.
Birkhoff, Robert D., A.S.
Black, Robert L., A.S.
Blitzer, William F., A.S.
Borden, Walter E., 3d, A.S.
Bossler, Franklin B., A.S.
Brayton, James F., A.S.
Bronson, Robert W., A.S.

- Brooks, Roman L., Lt. Comdr.
Brothers, George R., Jr., A.S.
Buell, Donald A., A.S.
Burns, Oscar K., A.S.
Butler, Vincent K., Jr., A.S.
Byer, Marshall, A.S.
Cannaday, Richard L., A.S.
Carroll, Francis L., A.S.
Cart, John M., A.S.
Cochran, James C., Lt. Comdr.
Cohen, Alvin S., A.S.
Cohen, David B., Mid.
Collins, Dwight, A.S.
Colman, William P., A.S.
Condie, Graham M., A.S.
Cooley, William J., R.T.3c.
Cromer, Ralph P., A.S.
Dexter, Raymond A., Ens.
Dietche, John L., Jr., A.S.
Doggett, Thomas A., A.S.
Donohue, Francis J., X., A.S.
Drumheller, Kirk, A.S.
Duff, Samuel E., 2d, A.S.
Dutton, Henry W. T., 2d, R.T.3c.
Eckhardt, Homer D., A.S.
Eisenhardt, George H., Jr., A.S.
Eldemond, Ray A., Jr., A.S.
Favreau, Romeo R., A.S.
Felter, James D., A.S.
Fischbeck, Kenneth H., Ens.
Flood, David P., A.S.
Folkoff, Richard D., Ens.
Frankenberger, Norbert, Lt. Comdr.
Freiberger, John J., A.S.
Gaffney, John F., A.S.
Gallagher, Frank J., Jr., A.S.
Gammon, Julian, A.S.
Gerber, Ralph I., Lt. Comdr.
Goldie, Charles H., A.S.
Graziano, Frank J., Lt. Comdr.
Gurley, Thomas C., Lt. Comdr.
Hahn, Aaron F., Jr., A.S.
Hantz, Benjamin F., Jr., R.T.3c.
Harrington, Matthew B., Jr., A.S.
Harris, Robert E., Lt. Comdr.
Hertig, John L., A.S.
Hickey, Thomas R., A.S.
Hoaglund, James B., A.S.
Hood, Roger W., A.S.
Hovkins, John S., Jr., A.S.
Isenberg, Louis, A.S.
Jerman, Daniel L., A.R.T.3c.
Johnson, Charles H., A.S.
Kelly, Edward J., Jr., A.S.
Kennedy, Norman C., A.S.
Kircher, Hartmann J., 3d.
Kriek, Albert P., A.S.
Kuhns, Read M., Jr., A.S.
Lacroix, Arthur J., Jr., A.S.
Landon, George K., Jr., A.S.
Lasko, Burt B., Ens.
2-46 Latimer, John P., Lt. Comdr.
Leonard, Harry J., A.S.
Lerner, Edward C., A.S.
Libbey, Miles A., Lt. Comdr.
Loeb, William A., A.S.
Luce, Richard W., Jr., A.S.
Luce, Robert D., A.S.
Luttenberger, Benjamin W., Jr.
McCracken, Leslie G., Jr., A.S.
McDowell, John R., 3d, A.S.
MacKay, William J., A.S.
MacKenzie, William, Jr., A.S.
McKewen, George E., Jr., A.S.
McMullen, John J., Lt. Comdr.
McNamara, Thomas J., A.S.
Magathlin, Robert N., A.S.
Manz, Robert L., A.S.
Markey, Thomas S., A.S.
Marocchi, Andrea A., A.S.
Martin, Richard R., A.S.
Massaglia, Paolo E. C., A.S.
Meacham, John W., Ens.
Meade, William J., Jr., A.S.
Mencher, Alan G., A.S.
Miller, Robert C., A.S.
Miller, Warren H., A.S.
Morrison, John W., Jr., A.S.
Mumford, Nicholas V., Jr., A.S.
Nesbitt, Richard J., Lt. Comdr.

- Nicholson, William E., A.S.
O'Connell, Walter H., A.S.
Oechsle, Joseph S., A.S.
O'Shea, John C., A.S.
Oxenham, Alfred J., A.S.
Patterson, Charles A., Jr., A.S.
Patterson, Jerome A., A.S.
Pelley, Raymond W., A.S.
Petzold, Robert F., A.S.
Plunkett, William H., Jr., Ens.
Pockman, William W., A.S.
Ramsey, Lyle B., Lt. Comdr.
Reed, Edwin A., A.S.
Remorenko, Ronald P., A.S.
Roseborough, William D., Jr., Lt. Comdr.
Roth, Robert B., A.S.
Rover, Harold V., A.S.
Rubin, Eugene S., A.S.
Ruehrmond, Max E., Jr., A.S.
Scherer, Ralph R., A.S.
Schindel, Leon H., A.S.
Schmitt, Robert D., A.S.
Schober, Marshall, A.S.
Selfridge, Oliver G., A.S.
Sherman, John H., A.S.
Smalzel, Charles W., Lt. Comdr.
Smith, James C., Jr., Lt.
Smith, Ogden R., A.S.
Smith, Shaler G., Jr., A.S.
Smith, Stanley W., A.S.
Sonsteli, Walter E., Ens.
Speaker, James W., A.S.
Springer, Clinton H., A.S.
Stevens, Donald L., A.S.
Stephenson, Thomas I., 3d, A.S.
Stephenson, Waite H., Jr., A.S.
Strang, Donald P., A.S.
Strand, James J., A.S.
Swartz, Paul W., A.S.
Tavener, Charles H., Jr., A.R.T.3c.
Test, Frederick L., A.S.
Thorkilsen, Harold, A.S.
Timmerman, Stanley G., Jr., A.S.
Trageser, David A., A.S.
Turbaugh, Marshall E., Lt. Comdr.
Turner, Robert, A.S.
Upton, George T., A.S.
Van Ingen, Lawrence B., Jr., A.S.
von Hemert, John O., A.S.
Walker, Neil F., A.S.
Walsh, Donald K., A.S.
Walzer, Martin J., A.S.
Walshburn, Edwin D., A.S.
Welch, Robert E., A.S.
Winkler, Richard C., A.S.
Witmann, Clifton R., A.S.
Wittmann, William C., Jr., A.S.
2-46 Bean, Lawrence A., S.1c.
Buckwalter, Robert C., R.T.3c.
Dorwart, Robert M., Sp.3c.
Doyle, Richard H., A.R.T.3c.
Drzazgowski, Stanley T., Ens.
Goldstein, Leroy, A.S.
Kallikan, John G., S.2c.
MacDonald, Thomas B., Ens.
Martin, William A., R.T.3c.
Pope, James W., S.1c.
Seville, Alfred R., A.R.T.3c.
Silver, Charles B., 2d, S.1c.
Stout, Ellarson R., P.1c.
Wightman, Mark A., S.1c.
Williams, Nils H., Jr., R.T.3c.
6-46 Almeda, Walter S., P.1c.
Atwell, Charles E., A.C.
Crowell, Albert D., A.S.
Ellis, Robert W., A.S.
Green, Robert T., A.S.
Griess, George F., E.M.3c.
Hardy, Wilbur H., Jr., A.R.M.3c.
Hart, Joseph C., Mid.
Hinkley, Curtis S., Jr., S.2c.
Holley, Wayland J., S.1c.
Jones, David W., T.M.3c.
Liberman, Cyrus S., S.1c.
Macy, Josiah, Mid.
Perrotta, Maxwell J., A.S.
Pritchard, Robert L., A.S.

Remick, Wilson J., A.S.
Siegel, Bernard L., A.S.
Smith, Bradford L., Y.3c.
Struby, Peter V., S.2c.
Struss, Thornton V., S.1c.
10-46 Albers, Robert C., S.1c.
Bartholomew, George S., S.F.3c.
Brackin, Marvin M., S.2c.
Carrig, Robert W., Mtd.
Cisar, John C., Jr., H.A.2c.
Coit, Lew G., Jr., S.1c.
Cotter, Lawrence E., Jr., S.1c.
Crutchfield, Billy J., S.K.2c.
Dell, Thomas F., S.1c.
Dunne, Maurice F., Jr., Mid.
Houck, Hugh N., F.1c.
Howell, Jerry M., S.1c.
Kozakiewicz, Richard K., F.2c.
Lee, Ingram, 2d, S.1c.
McGrath, John B., H.A.1c.
Meyer, Gregor F., S.1c.
Mower, William H., Jr., S.2c.
Orthmeyer, Donald W., S.1c.
O'Toole, James J., Jr., S.1c.
Perelles, Robert E., S.1c.
Schmitz, John V., S.1c.
Sillers, Donald A., Jr., S.1c.
Sisson, Roger L., R.T.3c.
Stark, Louis, S.1c.
Stepanoff, Loli G., S.1c.
Twomey, Thomas F., S.1c.
Wyant, Ira A., Jr., S.1c.
2-47 Basel, Louis, S.1c.
Bennett, Robert I., S.2c.
Blaisdell, Leonard L., S.1c.
Bullinger, Henry W., S.1c.
Dashiell, Landon M., S.1c.
Deshel, James O., A.S.
Donohue, William V., S.2c.
Gustafson, Craig S., S.1c.
Hopkins, Andrew D., A.S.
Hulme, Milton G., 3d, S.1c.
Keefe, William J., A.C.
Keene, Harold E., Jr., R.T.3c.
Kovaas, Robert A., S.1c.
Marrotte, Nelson W., S.1c.
Nagel, Herbert, H.A.2c.
Shaw, Horton R., S.2c.
Skillman, Henry H., S.1c.
Wideman, Floyd L., Jr., S.1c.

U.S.C.G.

6-45 Engel, Arthur B., Lt. Comdr.
Murati, George T., Lt. Comdr.
Pfeiffer, Arthur, Lt. Comdr.

U.S.M.C.

1938 McGown, Ira L., Pvt.
1939 Allen, John F., 1st Lt.
10-46 Coffman, Raymond P., Jr., Pvt.
Rockwell, Harry P., Pvt.
2-47 Chebookjian, Shant L., Pvt.
Foster, Isaac C., Pvt.
O'Connell, Thomas B., Pvt.

CHANGES IN RANK

U.S.A.

1910 Whitney, Theodore J., Lt. Col. to Col.
1914 Snow, Welton A., Maj. to Lt. Col.
1916 Blakney, Raymond B., Capt. to Maj.
1917 Gardner, Paul, Maj. to Lt. Col.
1918 Collins, Harold E., Capt. to Lt. Col.
1919 Bassett, William H., Jr., Maj. to Lt. Col.
1922 Taylor, E. Elvidge, Lt. Col. to Col.
1923 Aultman, Dwight E., Maj. to Lt. Col.
1925 Sachs, Henry N., Maj. to Lt. Col.
Stokes, John H., Jr., Lt. to Brig. Gen.
1926 Dean, Robert C., Lt. Col. to Col.
1927 Hall, Albro, Capt. to Maj.
Smith, Charles C., Lt. Col. to Col.
Wise, Frank G., Maj. to Lt. Col.
1928 Linebaugh, John E., Lt. Col. to Col.
Turner, Burnett C., Capt. to Maj.
Winter, Norman L., Lt. Col. to Col.
1929 Stagliano, Fiore J., Capt. to Col.
1930 Hertzka, Wayne S., Maj. to Lt. Col.
Martell, Warren H., Maj. to Lt. Col.
Roseman, Reuben, Capt. to Maj.
1931 Burntor, O. Whitmore, Jr., 1st Lt. to Capt.
Orleman, Carl W., Lt. to Capt.
Strong, John E., Lt. Col. to Col.
1932 Bridgman, Minot R. S., Maj. to Lt. Col.
Crocker, Otis W., Lt. to Capt.
Hodges, William H., Capt. to Maj.
Muller, George W., Jr., Sgt. to S. Sgt.

Pratt, Warren A., Capt. to Maj.
Robert, Paul A., Lt. to Capt.
1933 Beldon, Morris C., Maj. to Lt. Col.
Johnston, Douglas, Lt. to Capt.
Stearns, Charles B., Maj. to Lt. Col.
Wiley, John R., Maj. to Lt. Col.
1934 Carey, John J. M., Lt. to Capt.
Iantosca, Angelo, Capt. to Maj.
Matthews, William S., Jr., 2nd Lt. to Capt.
Moody, Robert L., Capt. to Maj.
Steinberg, Theodore, 1st Lt. to Capt.
Howard, Stanley B., Lt. to Maj.
1935 Kornetz, Norman S., Lt. to Capt.
Rosenberg, Arthur S., Pvt. to Lt.
Veal, Jess H., Lt. to Col.
1936 Abbott, William E., Capt. to Maj.
Blaisdell, Kenneth L., Capt. to Maj.
Davis, Elmer W. L., Maj. to Lt. Col.
Sawyer, Robert E., 2nd Lt. to Capt.
1937 Agnew, James C., Jr., Maj. to Lt. Col.
Chatfield, Miles B., Capt. to Lt. Col.
Garber, Alvin J., 2nd Lt. to 1st Lt.
Herzeca, Lincoln J., Lt. to Capt.
Kowalski, Frank, Jr., Lt. Col. to Col.
Loomis, Austin C., A.C. to Lt.
Matthews, Charles W., Capt. to Lt. Col.
Nickerson, Mortimer H., Lt. to Capt.
Rugo, Henry J., Lt. to Maj.
Sams, James D., Lt. to Col.
1938 Bruneau, Armand L., Jr., Corp. to Sgt.
Buehler, John P., Lt. Col. to Col.
Chapin, Jack F., Capt. to Maj.
Chase, George F. M., Pvt. to Pfc.
Golden, Harold L., T.5 to Sgt.
Hartman, Warden N., Jr., Lt. to Maj.
Wheale, John G., Capt. to Maj.
1939 Bagley, Henry C., Capt. to Maj.
Kibler, Edgar H., Jr., Lt. to Col.
Salmon, John L., 2nd Lt. to 1st Lt.
Usher, Edward M., Lt. to Maj.
Walker, William C., Pvt. to T.5.
Wooster, Robert B., Capt. to Maj.
1940 Haywood, Oliver G., Jr., Lt. Col. to Col.
Jefferds, Joseph C., Jr., Maj. to Lt. Col.
Martin, John E., Capt. to Maj.
Meany, William F., Lt. to Col.
Tower, Sargent N., Capt. to Maj.
Weinbrenner, George R., Maj. to Lt. Col.
1941 Baldwin, William J., Lt. to Capt.
Bises, George R., Pvt. to 2nd Lt.
Blake, Robert W., Jr., Capt. to Maj.
Bluhm, Joseph I., Lt. to Capt.
Burlin, Robert B., Cadet to Capt.
Davis, Walter B., Corp. to Maj.
England, John L., Lt. to Capt.
Kraft, Raymond H., Maj. to Lt. Col.
Rapkin, Maurice, Capt. to Maj.
Stadig, John E., Capt. to Maj.
Walkowicz, Teddy F., Capt. to Maj.
Williams, Robert S., Capt. to Maj.
1942 Aschaffenburg, Hans W., Pvt. to Pfc.
Ascoli, Giulio, Pvt. to T.4.
Beach, Morrison H., 2nd Lt. to Maj.
Borchert, John R., Capt. to Maj.
Budge, William W., 2nd Lt. to Capt.
Dengler, Alfred T., Lt. to Capt.
Elmdahl, Ben A., 2nd Lt. to 1st Lt.
Gibson, Richard C., Capt. to Maj.
Goldstein, Allen M., T.5 to Corp.
Greenes, Edward A., Capt. to Maj.
Heffernon, David P., 2nd Lt. to Maj.
Penn, Leo H., Lt. to Capt.
Russell, Richard E., 1st Lt. to Capt.
Sawyer, James H., Jr., 1st Lt. to Capt.
Stone, Fairfield N., Pvt. to O.C.
Valade, Lawrence H. J., 2nd Lt. to Capt.
Volanakis, Peter G., Lt. to Capt.
1943 Burnham, Charles E., 2nd Lt. to Capt.
del Valle, Angel A., 2nd Lt. to 1st Lt.
Harsch, John Erwin, Pvt. to Corp.
Helbig, John D., A.C. to 1st Lt.

Hubbard, Merton R., 2nd Lt. to 1st Lt.
Karnuth, Arthur E., 2nd Lt. to 1st Lt.
Kempster, John H., 2nd Lt. to 1st Lt.
Lichtenstein, Roland M., Pvt. to T.4.
Lydtotes, George A., A.C. to 1st Lt.
Lynn, Robert J., 2nd Lt. to 1st Lt.
McDonough, James O., 2nd Lt. to 1st Lt.
2-44 Axon, Donald T., Pvt. to T.5.
Benjamin, Roland, Jr., Corp. to Sgt.
Bersohn, Richard, Pvt. to Pfc.
Breen, John E., Pvt. to Pfc.
Brogle, Albert P., Jr., Pvt. to Lt.
Brown, David M., Pvt. to 2nd Lt.
Carmody, Thomas W., 2nd Lt. to 1st Lt.
Cohen, Henry, Pvt. to Pfc.
Dickey, Harry L., Jr., A.C. to 2nd Lt.
Engelmann, William C., A.C. to Lt.
Holbrook, Stanley E., Pvt. to T.5.
Ilfeld, Robert M., Pfc. to T.5.
McCurdy, William J., Pvt. to Lt.
Markus, Alvin A., 2nd Lt. to 1st Lt.
Redlin, William H., Jr., Pvt. to 2nd Lt.
Tisdale, Pierre A., 2nd Lt. to 1st Lt.
Van Valen, Maxwell, A.C. to 1st Lt.
Wagman, Joel I., 2nd Lt. to 1st Lt.
Wiggins, Richard F., 1st Lt. to Capt.
10-44 Barnes, Robert S., Jr., Pvt. to Lt.
Barton, William W., A.C. to Lt.
Bernheim, Samuel L., Pvt. to Pfc.
Brown, Norman L., Pfc. to T.5.
Connors, John W., A.C. to 2nd Lt.
Cutter, Henry T., Jr., Pvt. to 2nd Lt.
Davis, Theodore, Pfc. to S. Sgt.
Farmer, Harlow G., Jr., Pfc. to Lt.
Lurie, Henry A., Pfc. to Lt.
Mitchell, John R., Pvt. to 1st Lt.
Moore, John C., T.5 to Lt.
Mullen, Jay, T.5 to T.4.
Nichols, Theodore F., A.C. to Corp.
Powell, James L., T.5 to T.4.
Shapiro, Mathew M., Pfc. to Sgt.
Sundblad, Robert L., Pvt. to T.5.
Varner, Arnold M., Pfc. to Sgt.
Widelitz, Milton A., Corp. to 1st Lt.
Ziebarth, Charles W., Pvt. to T.5.
6-45 Bowen, Albert E., Jr., Pvt. to A.C.
Coons, George F., A.C. to Lt.
Havener, Arthur R., Jr., O.C. to 2nd Lt.
Henze, Henry L., Corp. to Sgt.
Jones, John R., Pvt. to Corp.
*Kurth, Malcolm H., Pvt. to Pfc.
Loomis George P., Jr., Pfc. to Lt.
Ostergaard, Paul B., A.C. to Lt.
Pigott, Joseph D., Cadet to 1st Lt.
Rudkin, Henry A., Jr., Pvt. to Pfc.

U.S.N.

1910 Ahlers, John G., Lt. Comdr. to Comdr.
1917 Mehaffey, William C., Comdr. to Capt.
1920 Pennoyer, Frederick W., Jr., Capt. to Rear Adm.
1921 Moran, Bernard H., Lt. to Lt. Comdr.
Randolph, Donald W., Lt. Comdr. to Comdr.
Willard, Lawrence L., Lt. to Lt. Comdr.
1922 Blanchard, C. Ford, Lt. Comdr. to Comdr.
1923 Daggett, Roswell B., Comdr. to Capt.
La Londe, William S., Jr., Lt. Comdr. to Comdr.
1925 Maher, Francis X., Lt. to Lt. Comdr.
1926 Creedon, Herbert T., Lt. to Lt. Comdr.
1928 Johnson, Ellis A., Lt. Comdr. to Comdr.
Ver Planck, Dennistoun W., Lt. Comdr. to Comdr.
1930 Walker, Francis S., Lt. to Lt. Comdr.
Westell, Joseph, Jr., Lt.(j.g.) to Lt.
1933 Hayden, Arthur S., Lt.(j.g.) to Lt.
Zabilsky, John, Lt. to Capt.

1934 Goodwin, Philip M., Lt. Comdr. to Comdr.
Gow, Robert B., Ens. to Lt.(j.g.)
1935 Close, Winston A., Lt.(j.g.) to Lt. James, John W., Lt. to Lt. Comdr.
Roth, Elmer J., Lt.(j.g.) to Lt.
1936 Sharp, W. Bennett, Jr., Ens. to Lt.(j.g.)
1938 Clough, F. Tenney, Ens. to Lt.(j.g.)
Curtze, Charles A., Lt. Comdr. to Comdr.
Muther, Richard, Ens. to Lt.(j.g.)
Oakes, Thomas B., Ens. to Lt.(j.g.)
1939 Hammond, Bradford C., S.1c to Q.M.3c.
Macomber, Brainard T., Lt. to Lt. Comdr.
Steiner, Richard L., Lt.(j.g.) to Lt. Comdr.
1940 Russoniello, Louis V., Ens. to Lt.(j.g.)
1941 Betts, Sherman W., Lt. Comdr. to Comdr.
Ferris, Theodore V., Ens. to Lt.(j.g.)
Jacobson, David, Jr., Ens. to Lt.
Meyers, Warren J., Ens. to Lt.(j.g.)
Wickstrom, Carl A., Lt.(j.g.) to Lt.
1942 Grady, Daniel B., Ens. to Lt.
Graham, William B., Ens. to Lt.(j.g.)
Horton, William A., Jr., Ens. to Lt.
Leon, Hayden L., Lt. to Comdr.
Noyes, Jonathan H., S.1c to R.T.3c.
Stewart, Pearson H., Lt.(j.g.) to Lt.
1943 Alschuler, John H., Ens. to Lt.(j.g.)
Angelos, Arthur C., S.1c to R.T.3c.
Czar, Edward J., Ens. to Lt.(j.g.)
Dyer, Thomas K. M., A.C. to Ens.
Dyson, John C., Lt. to Lt. Comdr.
Ernst, Edward E., A.R.T.3c. to Ens.
Frankel, Irvin J., Lt. to Lt. Comdr.
Frankel, Raymond F., Jr., Ens. to Lt.
Freedman, George, S.1c to R.T.3c.
Jarman, James F., Ens. to Lt.
Reswick, James B., Ens. to Lt.(j.g.)
2-44 Jencks, Kimball, Mid. to Ens.
Knight, Stephen J., Jr., Ens. to Lt.(j.g.)
Nichols, John R., Jr., A.S. to R.T.3c.
Nicolait, Robert, S.2c. to Ens.
Rehler, Kenneth M., Mid. to Ens.
10-44 Ashley, Donn L., Mid. to Ens.
Davidoff, Joseph B., Mid. to Ens.
Dodd, Robert P., Mid. to Ens.
Evans, Ralph L., Jr., A.C. to Ens.
Fabens, Henry B., A.S. to Ens.
Frailay, Jack H., A.S. to Ens.
Gray, Walter H., Jr., A.S. to Ens.
Hunt, Austin T., Jr., A.S. to Ens.

LIBERATED PRISONERS

1938 Burke, John G., Lt., U.S.A.
1942 Larkin, James J., Capt., U.S.A.
10-44 Davis, Theodore, S.Sgt., U.S.A.
Wong, Arthur C., Lt., U.S.A.

CASUALTIES

1904 *Bakewell, Joseph H., C.W.O., U.S.A.
1917 *Conaty, Francis S., Lt. Col., U.S.A. — on a troopship while being transferred as a prisoner of war from the Philippines to Japan.
1921 *NewCommer, David A., Col., U.S.A. — Southern France.
1924 *Royal, Forrest B., Rear Adm., U.S.N. — South Pacific.
1934 *Castle, Robert D., U.S.A. — Germany.
1939 †Putnam, Henry W., Capt., U.S.A. — Japan.
1941 *Van Tuyt, Richard A., 2nd Lt., U.S.A.
1943 †Fenton, Douglas G., Lt.(j.g.), U.S.N.
2-44 *Connett, Harold, Jr., Ens., U.S.N.
†Nagy, Bertram F., 2nd Lt., U.S.A.
10-44 *Seghers, Paul D., Jr., Lt., U.S.A. — China.
6-45 **Kurth, Malcolm H., Pfc., U.S.A. — Hospitalized in England.
*Lisk, Norman E., Jr., Lt., U.S.A.
2-46 *Hartzell, Irwin C., Jr., Lt., U.S.A. — Germany

★ Killed in Action

† Missing in Action

‡ Prisoner of War

* Died or Killed in Service

** Wounded

ALUMNI AND OFFICERS IN THE NEWS

Recognition

¶ For WELLES BOSWORTH '89, elected a full member of the Institute of France. Mr. Bosworth is especially known to the French for his work as general secretary of the Franco-American committee for the restoration, under the Rockefeller donation, of the monuments of Versailles, Fontainebleau, and Rheims.

¶ For WILLIAM R. GREELEY '02, given the honorary degree of doctor of fine arts by Boston University in May.

¶ For THOMAS SPOONER '09, recipient of the honorary degree of doctor of science from Bates College.

¶ For GEORGE C. KENNEY '11, General, Army Air Forces, tendered a big home-coming welcome in Boston, where on October 18 he was guest of honor at a dinner given by the city in the Copley-Plaza and attended by 125 leading civic and military figures. On October 19 he was entertained by Governor Tobin at luncheon in the Hotel Statler and received at Harvard and Technology, visiting the aeronautics laboratories at both, as well as the Radiation Laboratory at M.I.T.

¶ For CHARLES EDISON '13, awarded the honorary degree of doctor of laws by Lafayette College on June 16. In responding to the citation, he called attention to the influence of scientific education upon the progress of nations and referred to Russia as one that is making rapid strides. . . .

¶ For THEODORE P. WRIGHT '18, awarded the Daniel Guggenheim Medal for 1945 in consideration of his "outstanding contributions to the development of civil and military aircraft, and for notable achievement in assuring the success of our wartime production program."

¶ For PHILIP S. BROWN '20, on August 31 presented with a gold service pin and other gifts in observance of his 25 years with the Hartford Fire Insurance Company.

¶ For Victorine and SAMUEL E. HOMSEY '26, both winners of honorable mention and prizes totaling \$500 in a competition for automobile display room designs sponsored by the General Motors Corporation.

¶ For ROBERT S. PRESCOTT '32, recipient of the Meritorious Civilian Service Award for scientific accomplishments at the Naval Ordnance Laboratory in Washington, D.C., with citation for "outstanding achievement in the design and production of many types of test sets."

Bomb Blast

¶ The possibility of using atomic energy for military purposes was brought to government attention late in 1939. Toward the end of 1941, intensive research was undertaken by the Office of Scientific Research and Development, and it was then for five or six months that VANNEVAR BUSH '16 reported directly to the President upon its evolution. He was appointed one of the five members of a general policy group which in June, 1942, recommended expansion of the program and transfer to the War Department. Thereafter, complete executive charge of the atomic bomb project was given to LESLIE R. GROVES, JR., '17, Major General, C.E., U.S.A., of whom the Secretary of War said on August 6: "His record of performance in securing the effective development of this weapon for our armed forces in so short a period of time has been truly outstanding and merits the very highest commendation." A military policy committee of which Dr. Bush was chairman included WILHELM D. STYER '22, Lieutenant General, U.S.A. A combined policy committee established in August, 1943, included Dr. Bush for the United States and CLARENCE D. HOWE '07 for Canada. The United States members had as their scientific adviser RICHARD C. TOLMAN '03. Dr. Bush and Dr. Compton both figured on the interim committee for control of the Bomb. At the first test held in New Mexico on July 16, KENNETH T. BAINBRIDGE '25 had charge of the actual detonation. Other Technology men mentioned by the *Army and Navy Journal* of August 11 as among those whose services had been of particular value were Major HAROLD A. FIDLER '34 and Lieutenant Colonel ALFONSO TAMMARO '29.

In the Journals

¶ By ALLISON OWEN '95, "The Metric System — Why Not Now?" *Journal of the American Institute of Architects*, September.

¶ By ELMER A. HOLBROOK '04, "The Supply of Engineers for Industry," *Mining and Metallurgy*, September.

¶ By ALBERT HAERTLEIN '18, "Engineering for Peace," *Journal of the Engineering Societies of New England*, September 17.

¶ By FREDERICK S. BLACKALL, JR., '22, "For a Better New England," *New England News Letter*, August-September.

¶ By ALAN E. CAMERON '26, "Presidential Address, Mining Society of Nova Scotia," *Canadian Mining and Metallurgical Bulletin*, August.

¶ By HOWARD A. CHINN '27 and Philip Eisenberg, "Tonal-Range and Sound-Intensity Preferences of Broadcast Listeners," *Proceedings of the Institute of Radio Engineers*, September.

¶ By ROBERT S. HARRIS '28, "An Approach to the Nutrition Problems of Other Nations," *Science*, July 13.

¶ By WILLIAM R. MACLEAN '29, "The Reactance Theorem for a Resonator," *Proceedings of the Institute of Radio Engineers*, August.

¶ By BEVERLY DUDLEY '35, "Some Aids to Facilitate the Engineer's Academic Training," *Proceedings of the Institute of Radio Engineers*, August.

¶ By AUGUST T. ROSSANO, JR., '38, "Handle Insecticides with Care," *Western Farm Life*, July 15.

¶ By WILLIAM W. WURSTER, staff, Theodore C. Bernardi, and Ernest Born, "Proposed United Nations Center, San Francisco Bay Area," *Architectural Forum*, August.

Steppingstones

¶ For LUIS DE FLOREZ '11, Captain, U.S.N.R., who will be assistant chief, under Harold G. Bowen, Rear Admiral, U.S.N., of the newly created Office of Research and Inventions, authorized by the Secretary of the Navy and the Chief of Naval Operations to continue and to instigate such experimentation as is necessary to maintain the superiority of American naval weapons.

¶ For JOHN A. HERLIHY '11, elected one of two new vice-presidents of the Boston Edison Company.

¶ For FREDERICK W. BARKER '12, on October 10 elected president of the Syracuse Savings Bank.

¶ For ADELBERT D. HILLER '14, on September 26 named manager of the New England branch of the Veterans Administration, one of the 13 such branches recently created throughout the United States as a move toward decentralization of functions previously exercised in Washington.

¶ For EDWARD P. WARNER '17, elected president of the interim council of the provisional International Civil Aviation Organization. Dr. Warner, vice-chairman of the United States Civil Aeronautics Board, is the chief American delegate.

¶ For LUIS A. FERRE '24, as secretary of the Puerto Rico Statehood Association, a body seeking to secure for

Puerto Rico admission to the Union as a state.

¶ For OTTO E. KIRCHNER '24, named a member of the aeronautical subcommittee of the Technical Industrial Intelligence Committee of the Joint Chiefs of Staff of the Army and Navy, to investigate aeronautical developments in Germany.

¶ For GEORGE M. CUNNINGHAM '27, elected vice-chairman for 1945-1946 of the southern California chapter of the American Chemical Society.

¶ For ELLIOT B. GROVER '28, chosen to serve this last summer as a member of a joint commission sponsored by the War Department and the Technical Industrial Investigating Commission to inspect and study wartime developments in German textile processing and machinery.

¶ For WILLIAM E. CULLINAN, JR., '30, on September 1 named director of the Bureau of Aviation of the State Commerce Department, which acts in an advisory capacity for New York communities planning airports.

¶ For PIERRE S. DU PONT, 3D, '33, temporarily appointed on September 25 as state director of the Farmers Bank of Delaware.

¶ For FRANCIS O. SCHMITT, staff, at an early fall meeting elected treasurer for the year 1945-1946 of the Society for the Study of Development and Growth.

On the Platform

¶ BRYANT ESSICK '22, in an address before the Lions Club at the Los Angeles Biltmore on June 22, prophesied about 150,000 unemployed for southern California during the reconstruction period.

¶ SAMUEL H. CALDWELL '25 spoke at the Franklin Institute in Philadelphia on October 17 on "New Developments in Differential Analyzer Design and Construction."

¶ ARTHUR R. DAVIS, staff, conducted a symposium on "Chemical Equilibrium" at the seventh annual summer conference of the New England Association of Chemistry Teachers, held at the Massachusetts State College at Amherst from August 9 to 13.

¶ ROBLEY D. EVANS, staff, gave a talk on "The Anatomy of Atomic Nuclei" before a joint meeting of the Boston section of the Institute of Radio Engineers and the electronics group of the American Institute of Electrical Engineers held at Technology on October 19.

¶ ROBERT C. HOCKETT, staff, in a General Electric Science Forum address at Schenectady, N.Y., in July outlined the many war uses which have contributed to the sugar shortage.

¶ DIRK J. STRUIK, staff, spoke before the Samuel Adams School for Social Studies in Boston on September 13.

DEATHS

** Mentioned in class notes.*

¶ HENRY RAEDER '76, February 21, 1944.

¶ CHARLES A. CLARKE '77, April 27, 1944.*

¶ BYRON E. HIGGINS '77, July 25.

¶ FRANK T. HOPKINS '77, July 25.

¶ B. HAMMETT SEABURY '79, April 21.

¶ HARRY DRAPER '84, August 29.

¶ C. SNELLING ROBINSON '84, July 22.

¶ ARTHUR H. DOANE '85, July 31.*

¶ LOUIS F. CUTTER '86, June 26.*

¶ JAMES E. SIMPSON '86, August 23.*

¶ CHARLES H. KNAPP '88, February 21.*

¶ FRANK M. LADD '88, June 8.*

¶ BENOIST S. REDD '88, May 26.*

¶ LUTHER W. BRIDGES '89, April 14.*

¶ JOSEPH E. CHANDLER '89, August.

¶ PAUL R. HAWKINS '89, August 27.

¶ WALTER G. WUICHET '89, April 6.

¶ STEPHEN R. H. CODMAN '90, October 10, 1944.*

¶ ALLAN RAMSEY '91, April 10.*

¶ CHARLES O. BOURNE '92, February 21.*

¶ ABNER POLLARD '92, July 16, 1944.*

¶ FREDERIC W. FITTS '93, September 21.

¶ HENRY L. RICE '93, June 21.

¶ BURT S. HARRISON '94, August 17.*

¶ HERBERT E. HEWITT '94, October, 1944.*

¶ FRANK W. LOVEJOY '94, September 16.*

¶ HOWARD E. WHITING '94, June 12.*

¶ HARRY P. CODDINGTON '95, August 16.*

¶ HERMANN KOTZSCHMAR '95, September 3.*

¶ HENRY DISSTON '96, August 29.

¶ LEONARD G. EWELL '96, February 4.*

¶ JOHN L. WAGNER '96, July 1.*

¶ FRED E. BUSBY '97, June 12.

¶ HORACE A. KELLEY, JR., '98, January, 1941.*

¶ HERBERT M. CASE '99, March 31, 1941.*

¶ DWIGHT FARNUM '99, June 5.*

¶ HORTENSE W. LEWIS '00, February 22.

¶ MARY P. ANDERSON '01, March 8.

¶ JOHN R. MORSE '02, March 21.*

¶ GEORGE T. SEABURY '02, May 25.*

¶ JOSEPH H. BAKWELL '04, February 7.

¶ EDMUND J. HURLEY '04, January 4.

¶ SAMUEL A. McCLUNG, JR., '04, February 7.

¶ WILLIAM W. AMMEN '05, September 25.

¶ MAX CLINE '05, July 26.*

¶ ARTHUR T. HOOVEN '05, July 8.*

¶ MITCHELL MACKIE '05, June 21.*

¶ JAMES H. TEBBETS '05, June 12.*

¶ CHARLES A. HOWARD '06, June 15.*

¶ CARLTON M. SOULE '06, June 28.*

¶ WILLIAM C. TURNER '06, August 18, 1943.*

¶ STUART C. GODFREY '07, October 20. Brigadier General Godfrey, a veteran of 36 years of Army service was killed in a plane crash near Spokane, Wash., where he had been commanding officer of Geiger Air Field. A 1909 graduate of the Military Academy at West Point, he was engineer personnel officer of the American expeditionary forces in 1918 and after the Armistice was in command of the Second Engineers in Germany.

¶ JOHN B. HARLOW '07, May 16.*

¶ MARCELLUS RAMBO '07, February 10.*

¶ JOHN W. WOODRUFF '07, July 25, 1944.

¶ HAROLD MCCREADY '09, August 2.*

¶ J. PORTER HART '11, June 15.*

¶ ALANSON L. PALMER '11, January 30.

¶ HERBERT W. HALL '12, June 18.

¶ EARL E. GAGNON '13, January 8.

¶ CHARLES W. OLESON '14, June 3.*

¶ ROSCOE G. DICKINSON '15, July 13.*

¶ FRANCIS S. CONATY '17, December 15, 1944.*

¶ SAMUEL W. SWEENEY '18, June 19.

¶ ALFRED A. ELLSWORTH '20, May 14.

¶ MONROE SHAKESPEARE '20, August 30.

¶ CARL W. STARCK '21, February 28.

¶ RAYMOND L. VAUGHN '22, August 29.*

¶ FALCONER V. McCULLOUGH '23, January 4.

¶ FRANK W. GARRAN '24, September 18.

¶ JAMES W. LOWRY '25, September 26.

¶ JOHN A. MILLER '25, June 8.*

¶ DEXTER K. COOLIDGE '27, May 30.

¶ SUSAN MELLE MILLETT '29, June 25.

¶ CARL P. STRATTON '34, July 6.*

¶ PAUL W. DOVE '35, September 7, 1944.

¶ WILLIAM B. DU PONT '36, August 9.

¶ JOHN W. IRVINE, JR., '39, September 4.

¶ PIERRE G. BARBEY '41, October 30, 1943.*

¶ ARNOLD M. REYNOLDS '41, October 11, 1944.*

¶ LEO H. PENN '42, September 30.

¶ HAROLD CONNETT, JR., 2-44, June 20, 1944.*

¶ JAMES S. McCLAVE, 2-44, February 28.*

¶ JAMES R. McKELVEY, 2-44, June 1.*

¶ PAUL G. NELSON, 2-44, January 5.*

¶ ELBERT PRITCHARD, 2-44, date unknown.*

¶ GEORGE A. SCHUTTE, 2-44, February 12.*

¶ HENRY C. SHEPARD, 2-44, September 18, 1944.*

¶ WALTER J. FREUND, JR., 10-44, January 7.

¶ ROBINSON PIERCE, former staff, August 6.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Chicago

The Club held a dinner meeting in the Sherman Hotel's Louis XIV Room on June 6. This, the final meeting of the year under the administration of Sherry O'Brien '17, was highlighted by Robert Wilson '16, chairman of the board of the Standard Oil Company of Indiana, who spoke on the research problems involved in getting the maximum burning power from petroleum products. Mr. Camp, physicist of Armour Research Foundation at the Illinois Institute of Technology, then demonstrated their new wire recording device. The members poured questions at Mr. Camp from the floor, to the extent that he found himself entangled with Mr. Petrillo's royalties, as regards these recordings, Petrillo's cut. Mr. Camp gave a very able talk in connection with his demonstration, which seemed much like dessert after a full evening of election of officers and directors, and discussion by Dr. Wilson.

The nomination committee, under the chairmanship of Armand Peycke '11, put up the following candidates: for president, Edmund G. Farrand '21; for vice-president, T. Bryce Spruill '31; for secretary, Elmer D. Szantay '35; for treasurer, Robert W. Van Kirk, Jr., '18; for the board of directors, each for three-year periods, Don Gilman '32 and Robert W. Clyne '30; for two years to fill the unfinished term of Thomas F. Russell '27, who was moved from our district, Jack Herlihy '27. The chairman requested further nominations from the floor. There being none, a vote was taken, and the above officers and directors were unanimously elected.

After dinner the entertainment committee provided a team of mystic interpreters consisting of a blindfolded woman and her gentleman assistant, who moved through the audience picking up cards and requesting her to state the name, serial number, addresses, and the like, on the card. The questions and answers were highly amusing, and the entertainment committee is to be commended on the program. Complete in every respect, the meeting was adjourned at 10-45 P.M.

Alumni in attendance included the following: 1887: Lonsdale Green; 1900: G. M. Holbrook; 1903: L. L. Hunter; 1905: E. G. Allen, H. B. Harvey; 1908: W. F. Dolke, A. T. Scannell; 1909: G. E. Wallis; 1910: D. V. Williamson; 1911: J. F. Duffy, W. O. Whitney, E. L. Woodward; 1912: J. H. Pratt, F. L. Mowry; 1913: V. G. Kay; 1914: F. F. Mackentepe; 1915: C. T. Dunn; 1916: W. C. Brown, E. D. Hale, S. A. Hoffman, R. E. Wilson; 1917: J. S. O'Brien; 1918: G. C. Davis, R. W. Van Kirk, Jr., A. F. Sawyer; 1919: H. A. Kerzog, and son Bradford, E. F. Seifert, B. H. Sherman; 1920: F. W. Boley, L. E. Boyden, F. J. Foley, F. B. Hunt, H. F. Smiddy; 1921: John W. Barriger, 3d, R. D. Cooper, E. G. Farrand, F. M. Post; 1922: F. J. Burt, J.

N. Duvernet, A. J. R. Houston, R. J. Sholtz; 1923: Philip Coleman, C. C. Henry, M. E. Parker; 1924: E. W. Brugmann, G. H. Sayler; 1925: C. M. Billman, A. A. Lauria, F. D. O'Neil, A. F. York; 1926: O. B. Wiessner, J. H. Wills; 1927: P. W. Creden, J. A. Herlihy; 1928: J. G. Praetz, Jr., P. A. Stephenson, Robert Wise; 1930: R. W. Clyne; 1931: E. F. Abbott, Jr., T. Bryce Spruill, H. S. Smith, B. T. Stott; 1932: D. W. Feters, D. B. Gilman, L. E. Jones; 1933: C. H. Mohr, H. V. Richards, R. G. Seyl; 1934: E. Q. Sylvester, 2d, J. L. Wien; 1935: Gerard DeGelder, Jr., J. J. Ryan, E. D. Szantay; 1939: J. F. Coffey, J. W. Mohlman, J. E. Seebold, R. M. Soria; 1940: R. K. Deutsch, F. J. Port, Jr.; 1941: H. E. Dato; 1942: N. P. Pinto; 1943: V. E. Otto. — ELMER D. SZANTAY '35, Secretary, Sandee Manufacturing Company, 3945 North Western Avenue, Chicago 18, Ill.

Technology Club of Northern Texas

A meeting of the Club attended by 11 members and four guests was held on July 27 at the Dallas Athletic Club with Armand J. Abrams '24, President, speaking on the "Chemical Engineering Activities at T.V.A." It was generally agreed that for the present the noonday luncheon type of meeting was most suitable. Accordingly, luncheon meetings will be continued.

Dr. Abrams stated that despite the general public opinion that the Tennessee Valley Authority was only an electrical power project, T.V.A. has also been very instrumental in the development of superior fertilizers for agricultural purposes. The development of calcium metaphosphate fertilizer was pioneered by the T.V.A. In the past year, 31,500 privately owned test demonstration farms located in 28 states have been aided by this fertilizer. In addition to the development of power, the aims and purposes of the T.V.A. are to increase utilization of the mineral resources of the Tennessee Valley as well as rebuilding of the land and prevention of land erosion. It was also pointed out that in the past year the wartime activities of the T.V.A. supplied 100,000 tons of carbide, used in the manufacture of rubber, and 130,000 tons of ammonium nitrate, used in the manufacture of explosives.

Royal B. Jackman '32, chairman of our postwar replacement committee, was called back to Inglewood, Calif., and so will no longer be able to engage in the activities of our Dallas Club. A new chairman of the replacement committee was, at this writing, soon to be appointed. We were sorry to have Mr. Jackman leave us and extend to him our appreciation for the work he has started.

A talk on the atomic bomb by G. E. Kidd was the high point of the next meeting of the Club, held at the Dallas Athletic Club on September 28 with a noon luncheon at \$1.25 a plate. Mr. Kidd is chief of the design section of the Magnolia Field research department and worked on the atomic

bomb project while on leave of absence. Since secrecy orders have been lifted from a considerable portion of the work on the atomic bomb project, Mr. Kidd's talk was full of interesting information. — DAYTON H. CLEWELL '33, Secretary, Magnolia Petroleum Company, Field Research Department, Postoffice Box 900, Dallas, Texas.

Technology Club of Hartford

Our Club held its annual outing on June 30. The traditional last Saturday in June found 15 members and guests gathered for the festivities at Lake Compounce in Bristol, Conn. The outing was quite different from those in previous years in that the miniature railroad ride around the lake, the merry-go-round, the "dodgem," and the roller coaster, along with the penny arcade, were the only sports indulged in other than swimming, which was quite popular, the day being pleasant and warm. After the planned activities, some of the golfers repaired to the near-by course. This outing was novel in another respect — that several men brought their wives and children for a day's picnic in the amusement park during our activities and dinner. Norman J. Vile '16 presided over the affair as incoming president. All agreed that a good time had been had and look forward to resumption of our shore outings next year. — LOUIS J. PROULX, JR., '36, Secretary, 31 Wells Road, West Hartford 7, Conn.

Southwestern Association of the M.I.T.

On the evening of June 8, the Association held a dinner meeting in the Pine Room at the Union Station. Thirty members and guests were present, including Beverly Kirkwood, recipient of the regional scholarship for this year, and Lawrence Degan of St. Joseph, Mo., who received a freshman award. In the absence of Fred Dierks '12, Mark Culbreath '30 presided over the meeting. After the guests had been introduced, brief mention was made of the postwar placement program being sponsored by the Institute. The names of the men on the local committee were announced — Harry L. Havens '09, William L. McPherrin '14, James C. Irwin, Jr., '18 — and an outline of the work being undertaken by this committee was given.

Jim Irwin, Honorary Secretary of the Institute for this district, then gave an interesting talk on the work handled by him, including an explanation of the regional scholarship and other awards made by the Institute in this district. We were all especially pleased to have Jim present. He was seriously injured in April while inspecting a plant in Dallas, and he attended our meeting with his back encased in a cast. We are all thankful that he is making such good progress and hope the road to complete recovery will not be a long one.

Next in the order of business was election of the following officers: President, Mark C. Culbreath '30; Vice-president,

William B. Schneider, Jr., '32; Secretary, Reginald W. Bulkley '27.

Finally, George Krebs '39, one of our active younger members, told of some of his experiences in 1942 while serving as a captain with Pan-American Airways of Africa, Ltd. In addition to being well seasoned with humor, this talk was exceptionally informative, especially in its account of the carefree British manner of waging war at that time. After showing us Kodachrome movies taken in Africa and the Middle East, George, who is chief test pilot for North American Aviation's Kansas City, Kansas, plant, conducted a brief question period which proved exceedingly interesting. The meeting adjourned at 10:15 P.M., with everyone apparently feeling that he had received his money's worth both in food and in entertainment. — REGINALD W. BULKLEY '27, Secretary, 840 Westover Road, Kansas City 2, Mo.

Technology Club of Southern California

The first meeting of the year was held on June 21 at the University Club of Los Angeles. Out of approximately 1,000 members in this area, 75 Alumni attended the gathering, conducted as a forum on "Post-war Opportunities for the Technical Man." Those present were predominantly from the aircraft, petroleum, and shipbuilding industries. Ford W. Sammis '28, President of the Club, arranged and led the forum. Before the discussion period, brief talks were made by Mac Short '26 of Lockheed Aircraft Corporation, Ralph B. Atkinson '29 of Atkinson Laboratory, and Kenneth C. Kingsley '23 of Norris Stamping Company.

Mac Short stressed the opportunities opened in the transportation industry by the application of lessons learned in the aircraft industry — in the fabrication and use of light metals; in the use of electric, hydraulic, and pneumatic equipment; and in the understanding of the significance of "power loading," "wing loading," and their equivalents. Mr. Short felt that aeronautical engineering might return in the postwar era to its pre-war status of part hobby, part business.

Ralph Atkinson spoke chiefly on "Going into Business for Yourself." He indicated that many opportunities would be open in the fields of industrial service, product development, and in other allied sales and service fields. Mr. Atkinson pointed out that opportunities in the form of needed enterprises are sometimes listed by chambers of commerce. Entering business as a consulting engineer is considered an especially tough job. To make a go of your own business, Ralph felt it particularly necessary to have sufficient capital and to know the needs of the community and one's own business thoroughly. Mr. Atkinson also spoke briefly on the local chemical industry, pointing out that most chemists in this area serve the petroleum industry, with the synthetic rubber industry next in importance.

Kenneth Kingsley dealt with the coming growth of the Los Angeles area. He predicted an industrial "coming-of-age" for this region, pointing out that it now has a heavy metals industry, heavy chemicals, textiles, synthetic rubber, and a good labor market. The district is readily accessible

by land, sea, and air, although present transportation facilities are inadequate. The export markets of the Orient, Australia, and South America are accessible, making an outlet of such size that Eastern manufacturers can afford to duplicate here, to a considerable degree, their Eastern investment in plants and tools.

Since the above meeting, the Club was fortunate in making arrangements for a small luncheon while A. Warren Norton '21, President of the Alumni Association, was in our city. Through the courtesy of Mr. Toll we were able to meet at the University Club of Los Angeles on September 13. The luncheon, served buffet style, was excellent, as is customary at the Club. Those present, reading clockwise around the table from Mr. Norton, were Ford Sammis '28, Kenneth Kingsley '23, Charles Toll, Jr., '23, Harry Kohl '37, John Glacken '38, Charles Lindblom '40, John Pitkin '37, Ralph Atkinson '29, Don Weir '38. Mr. Norton spoke to us for about an hour and had to eat as best he could while he talked. For us it was easy: we ate and listened. — JOHN B. PITKIN '37, Secretary, Route 1, Box 386 P, La Canada, Calif.

New Haven County Technology Club

Golf, tennis, sailing, swimming, bar, and dining privileges were thoroughly enjoyed by 23 members at the Pine Orchard Club on Saturday, June 16. This outing, winding up a successful season under the presidency of Al Blank '37 of Waterbury, began at 2:00 P.M. on a fair hot day and closed reluctantly about 10:45. Some twosomes braved 18 holes, others contented themselves with nine. As usual the "I play once in five years" and the "Loan me any two clubs, and I'll play" boys came in with low scores (allegedly). Herb Polleys '18 took his 30-footer out for the first sail of the season, which was greatly enjoyed by Williams '21, Grew '27, and first mate Marshall Wellington '16. Shortly before dinner, Buck '29, Boyd '18, Grew, and Williams all paraded their muscular torsos to the beach for a refreshing swim. No arrests and no conquests indicate their 1945 standing. A delicious and plentiful lobster dinner served in the main dining room overlooking the yacht basin reflected the thorough arrangements made by Roy Parsell '14, who unfortunately could not attend because of business in Chicago.

The evening activities opened in the main lounge with orchestrations by Carl Blanchard '18 (piano, accordion, and trumpet), Charlie Williams (banjo), Constant Moeller '33 (violin), and Steve Metcalfe '23 (piano). Al Redway '23 led the barber shop and operatic group in singing. President Al then welcomed the "quality" present but regretted that more of the membership did not see fit to relax for a day under such favorable conditions. Later, Haig Solakian '17 opened a discussion of this item, which was ultimately called to the detailed attention of the incoming officers. Al expressed appreciation of the efforts of Roy Parsell and Bill Pinkham '22 in obtaining the freedom of the club. He announced the Class of 1925 dinner in Boston on June 23. Charlie Williams won a round of applause for his election to the national nominating committee. Each man then arose and gave his

name, class, and business affiliation. The advertising statements offered by some were largely discounted and roundly hissed.

The reports by the secretary and treasurer were accepted, along with the auditor's report. C. E. Smith '00, chairman of the post-war placement committee, reported several meetings with Manning '12 and Haskell '20 in preparation for assistance requests particularly anticipated from members of the expedited courses who will enter industry for the first time after hostilities cease. The scholarship fund committee was reported inactive pending more favorable conditions. Details of nonresident membership privileges in the Technology Club of New York were presented. The election committee reported that only 19 ballots had been properly cast and that one of these had been declared void. The following officers were declared elected: President, Natale Gada '26; Vice-president, Floyd Buck '29; Secretary, Lawrence Grew '27; Treasurer, Judson Rogers '40; and Governor at large, Albert Blank '37. A rising vote of thanks was given to the outgoing officers.

President Gada was then introduced. He briefly outlined his plans, appointed a program committee consisting of Herb Polleys '18, chairman, Morton Plant '31, and William Young '29, and turned the meeting back to Al for the remainder of the evening. Manning, as program chairman, was called upon to introduce Alan Crowell '25, who had been calmly recording the entire evening's events on a soundscriber, for which equipment he acts as sales manager. Embossing 200 grooves an inch with five-ounce pressure on each side of an eight-inch vinylite disc gives, with a half-ounce playback, one half hour of indestructible, mailable voice or musical recording at a present cost of about 10 cents. Use of the equipment by the military and the press, by business, language instructors, and individuals was cited and demonstrated. Playback of portions of the evening proved the efficacy of the equipment but cast doubts upon the quality rating bestowed upon the group by President Blank insofar as vocal attainments were concerned. Many questions and continued individual demonstrations attested to the interest in Crowell's entertainment. Musical and vocal entertainment was resumed until the late good nights.

Alumni who attended were these: 1900: C. E. Smith, New York, New Haven, and Hartford Railroad; 1911: W. T. Jones, railroad supply; 1912: Kenneth Cartwright, New York, New Haven, and Hartford Railroad, H. G. Manning, patent lawyer; 1916: M. S. Wellington, New Haven Water Company; 1917: H. N. Solakian, A. F. Holden Company; 1918: C. W. Blanchard, Wyatt, Inc., Stuart Boyd, United States Rubber Company, H. R. Polleys, United States Rubber Company; 1920: Ettore Ciampolini, doctor; 1921: C. A. Williams, United Illuminating Company; 1922: W. D. Pinkham, Malleable Iron Fittings Company; 1923: S. B. Metcalfe, American Steel and Wire Company, A. S. Redway, Geometric Tool Company; 1924: W. R. Weeks, General Electric Company; 1925: A. W. Crowell, Sound Scriber Corporation, B. R. Hubbard, Whitney Blake Company; 1926: Natale Gada, General Electric Company; 1927: L. B. Grew, Southern New England Telephone Company; 1929: F. W. Buck, United Illuminating Company; 1933: C. A.

Moeller, Sikorsky Aircraft; 1937: A. I. Blank, Chase Brass and Copper Company.

In September, word came that Natale Gada, President, who has been associated with the New Haven office of the General Electric Company, had accepted the position of sales manager of their emergency radio equipment division at Syracuse, N.Y., effective as soon thereafter as possible. Mr. Gada will be sincerely missed by his New Haven friends, who have warmly congratulated him and look forward to his expected New Haven visits. Vice-president Buck will soon inaugurate the program for 1945-1946. — LAWRENCE B. GREW '27, *Secretary*, Southern New England Telephone Company, New Haven, Conn.

Technology Club of New York

The Club started the 1945-1946 season off with the annual dinner and election of officers on May 29, with some 40-odd members present and plenty of enthusiasm. As is the usual custom, this meeting was held in the clubhouse at 24 East 39th Street. George Dandrow '22 presided in his usual suave manner; and after the meeting had been brought to order, Al Glassett presented the slate of the nominating committee for officers for the coming year. After discussion for and against, the following officers and board of governors were elected: President, C. G. Dandrow '22; Vice-presidents, E. S. Burdell '20, R. C. Rundlett '22, J. H. Zimmerman '23, W. H. Mueser '22; Treasurer, W. I. McNeill '17; Assistant Treasurer, W. J. Littlefield '17; Secretary, W. W. Quarles '24; for Governors serving to 1948, S. W. Fletcher '18, W. H. Latham '26, H. J. Payne '22; serving to 1947, A. R. Wiren '19, F. B. Briggs '22, A. W. Norton '21; serving to 1946, S. H. Reynolds '22, D. H. McNeal '23, and A. N. Mooradian '34. From the above, the statistically minded will note that the Class of 1922 is still in the driver's seat and rightly so.

The general feeling was one of enthusiasm and desire to make many fundamental improvements in the Club this year, for the benefit of the some 3,500 Alumni of the Institute living in the Greater New York area and the many members we have lost to the armed forces since 1940. If we can provide facilities and companionship for the above as well as for the undergraduates who will soon be heading our way, it is felt that the Club can make itself a dominant factor hereabouts and also help to promote the Institute and its graduates. Undoubtedly, many who read this news item can swing a heavy oar, if they will only join up and volunteer their personalities and valued thoughts in support.

When Bill Neuberg '17, who had been secretary for many years, turned the membership records over to the new officers, the score was something like this: life members 13, honorary members 2, resident "A" (full membership) 142, resident B, C, and D, 3, nonresident 154, special 1, in all making about 315. We hate to admit it, but this represents less than 10 per cent of those living in the area and eligible for one type of membership or the other. But our membership committee, headed by Sam Reynolds '22, is now working on some aggressive plans whereby we hope to improve our score in a big way. If anyone reading this news sheet knows of a good live-wire

prospect for the Club, who has moved to New York recently, or has been hanging out in these parts undetected, please drop a card to either Sam or myself, and we will do the rest.

Since last reporting, the following new members have been elected to the Club, to wit: Henry W. Clement '90, Duncan Shaw '14, Raymond Stevens '17, James A. Lee '18, Arthur Smith '18, Jacob Braverman '19, Lauren B. Hitchcock '20, James J. Wolfson '20, Zambry P. Giddens '21, John J. Healy, Jr., '21, C. E. B. Coleman '22, F. N. Dillon, Jr., '22, Eric F. Hodgins '22, Raymond F. Hibbert '27, Glenn D. Jackson, Jr., '27, D. Anson Rosenthal '27, John B. Calkin '32, G. Edward Nealand '32, G. Peter Grant '35, Marshall M. Holcombe '36, Irving S. Underhill, Jr., '38, James O. McDonough '43, John J. Sullivan, Jr., '43. This brings our total membership of all types up to 330, and by this time a year from now, we hope to have at least 500, or more, members.

For the purpose of bringing up to date the latest newcomers, we publish herewith the names of our members who turned out for the annual meeting on May 29, as follows: J. C. Duff '86, G. R. Wadleigh '97, H. B. Chalmers '00, P. B. Sadtler '06, A. L. Weil '01, A. P. Mathesius '06, A. H. Jansson '07, R. H. Gould '11, R. A. Fletcher '16, W. I. McNeill '17, W. D. Neuberg '17, L. H. Flett '18, Jacob Braverman '19, N. P. Dana '20, J. F. Downey, Jr., '20, A. T. Glassett '20, S. C. Reynolds '20, C. G. Dandrow '22, F. D. Gage '22, W. D. Pinkham '22, S. H. Reynolds '22, W. L. Kepingler, Jr., '24, P. H. Littlefield '24, Edward Wininger '24, W. H. Latham '26, J. R. Bonnar '27, H. L. Richardson '31, G. M. Garbarino '33, A. N. Mooradian '34, E. H. Cargen, Jr., '36, and of course, your humble servant who is doing the dirty job.

The annual golf outings, which were started some time ago, are fast becoming the number one form of entertainment. Don't let the fact you are a dub annoy you, for you will have plenty of company from our number one guy, on down the roster. Guess you know to whom I refer. For those who don't go in for victory gardening or snake killing at these affairs, there are the usual number of hot bridge games, swimming, parlor stories, and the great American pastime. Everyone gets home under his own power, however, and I can assure you that they are good wholesome fun and leisure. At the last outing, at Scarsdale Country Club, arranged through the courtesy of Larry Davis '22 and "ducks a la Dandrow," the following turned out and got home without accident, to wit: Doc Duff '86, F. B. Cutter '98, George Heckle '99, Al Weil '01, N. C. Nicol '08, Dean Lobdell '17, Bill McNeill '17, Bill Neuberg '17, L. H. Flett '18, E. R. Smoley '19, F. L. Bradley '20, C. E. Brown '20, Sam Burr '20, W. L. Chaffin '20, B. J. Clark '20, G. F. des Marais '20, N. P. Dana '20, J. F. Downey, Jr., '20, Al Glassett '20, H. A. Grosscup '20, P. F. Lavedan '20, M. B. Lees '20, J. D. Mitsch '20, S. C. Reynolds '20, R. W. Tirrell '20, Z. P. Giddens '21, Bill Kennedy '21, Warren Norton '21, Ferris Briggs '22, George Dandrow '22, Larry Davis '22, Bill Ferguson '22, Frank Gage '22, F. M. Kurtz '22, Dave Minton '22, Judd Payne '22, C. W. Perkins '22, W. D. Pinkham '22, Sam Reynolds '22, Ray Rundlett '22, Luke Wal-

ton '22, F. L. Cronin '23, Don McNeal '23, Chuck Springer '23, Jack Zimmerman '23, Dave Evans '24, F. L. Gemmer '24, Anatole Gruehr '24, Ray Hamilton '24, Bill Kepingler '24, N. Schooler '24, Greg Shea '24, Ed Wininger '24, Henry Zeiger '24, M. L. Radoslovich '26, Jimmie Walker '26, J. R. Bonnar '27, Bill Winsor '27, Ed Ryan '28, E. S. Goodridge '33, G. S. Maynard, Jr., '33, Andy Mooradian '34, and, of course me, too. We also had a small, informal gathering on short notice in September at the Mount Kisco Country Club as guests of Bill Mueser, at which 16 men of all vintage turned out for the usual exercise, both outdoor and in.

Jack Fruit '02 is chairman of the club re-employment committee and is rapidly getting an active committee organized and ready to function. Although the rate of re-employment demands is not very high at present, we anticipate being able to perform a useful service to both the individual and the companies. We are trying to obtain an outstanding Tech man from many lines of industry and business to head a subdivision of this committee and are open for any who may care to volunteer their services. It will not require much of your time and will mean a great deal to the men returning from the services and leaving the Institute. In the meantime, you may get your hands on some first-class material for your own needs. If you have any opportunities with your companies, would you please drop Jack a note in care of the clubhouse, or give him a call. The Club has his telephone number on call.

We are planning something really big around early December, and you'll hear more later. Dr. Compton will be the No. 1 attraction, we hope, but are awaiting his return from Manila for confirmation. It will be something every Tech man in the area will want to attend. Please let me know of any news breaking around here. — W. W. QUARLES '24, *Secretary*, 330 West 42 Street, New York 18, N.Y. WILLIAM L. KEP-LINGER, JR., '24 *Publicity Committee*, care of Johns-Manville Corporation, 22 East 40th Street, New York 16 N.Y.

M.I.T. Club of Northern New Jersey

The first meeting of the Club for this season was held on November 1 at the Newark Athletic Club. Waldo G. Bowman, editor of *Engineering News-Record* and war correspondent, spoke on his firsthand observation of engineering contributions to our victory. A witness of the landings in North Africa and Sicily and of bombings of the oil centers in Ploesti, he saw the road built through Iran to Russia and has seen the construction of ports, airfields, depots, and such, in England, France, Belgium, Holland, and Germany. He made an engineering survey of the Remagen bridge only 10 hours before it fell into the Rhine. Above all, he is a talented speaker who can thrill his audience. — FRANK O. PIERSON '29, *Secretary*, 15 Wyndehurst Drive, Madison, N.J.

Technology Club of Philadelphia

Your Secretary is writing these notes during the third week in September. Closing dates being as they are, we shall be unable

to tell you of our October 16th meeting with Professor Francis O. Schmitt, Head of the Department of Biology at the Institute. The closing date for the December issue occurs but a few days after our October meeting; thus in December we hope, you will learn of the entertaining as well as instructive evening we are now anticipating with Dr. Schmitt.

Now for the news of the summer and our program for the winter. Plans for the coming season were made by the officers and committee members at the farm of President Anderson '15 on July 21. We who were fortunate enough to attend had a most delightful afternoon at his charming home, where the food was as delicious as the surrounding country was beautiful. Although those plans continued in effect the three scheduled meetings during the third weeks of October, January, and May, considerable advance planning was done to assure the success of future meetings and encourage acceptance by speakers of prominence whose topics are of national interest.

As a further service, a directory of active members of the Club will be published and distributed to all such members. This directory will include the available information on the class, address, and business of all members whose annual dues of \$2.00 were paid by October 17. Tardy membership will be \$3.00 as usual, without benefit of inclusion in the membership directory. It is unfortunate that only 460 of the 1,060 Alumni in this area have demonstrated interest in the activities of the Club. In order that these interested members shall not be penalized with unnecessary club expense, it is considered proper and fitting that meeting announcements be restricted to them. The membership directory will be distributed at the January meeting. Copies will be mailed to active members if mischance prevents their attendance. Bradley Dewey '09, President of Dewey and Almy Chemical Company of Cambridge, will speak at this January 15th meeting at the Bellevue-Stratford. Colonel Dewey, former czar of the rubber administration, will have a message of great interest to Philadelphia Alumni and their guests.

Our good friend and former Treasurer, Hal L. Bemis '35, a lieutenant colonel, has been awarded the Bronze Star for unusual and outstanding services with the Sixth Army Group. This award is in addition to the Legion of Merit and a citation by General Dwight Eisenhower given him for his achievements in connection with military operations in Corsica and France. Those of us who worked with Hal in the activities of the Club are delighted to hear of our government's appreciation of those qualities which have always been such an integral part of him.

Increasing interest has been demonstrated in the placement planning and guidance committee under the able direction of R. E. Worden '36. Until recently personnel manager of the Campbell Soup Company and chairman of the industrial relations committee of the Chamber of Commerce, Bob will now continue his activities in management engineering and industrial relations as a partner in John I. Thompson and Company of Washington, D.C. At the September meeting of the steering group of the placement planning and

guidance committee, Andy Anderson accepted the resignation of Bob Worden as its chairman with deep regret and sincere appreciation of his splendid work. In addition to laying the groundwork for your Club and maintaining close co-operation with the Cambridge group, Bob has already arranged the placement of a number of Technology graduates. Fortunately, Bob will continue to live, at least temporarily, in the Philadelphia area and will remain a member of the steering group. Your President appointed genial Ed Healy '23 and capable Phil Alden '22 as chairman and vice-chairman respectively of this important committee. Both of these men are well known for their fine constructive work as past presidents of the Club and for their conscientious application of effort in the interests of the members. The policies as established by Bob Worden will be continued in effect, and an outline of the complete setup of the placement planning and guidance committee will be submitted by Ed Healy at the October 17th meeting. It is suggested that interested Alumni communicate directly with Ed Healy at the Philadelphia Brewing Company, 6th and Clearfield Streets, or with Phil Alden at the Philadelphia Electric Company, 1000 Chestnut Street, Philadelphia, outlining their interests in detail in order that the new chairmen may be in a position to offer helpful suggestions without unnecessary delay. Andy Anderson has indicated that the general policy would be a one-year term for the chairman and vice-chairman and has expressed the hope that other outstanding and unselfish leaders will act in these capacities in the future. The far-reaching importance of this activity requires no elaboration.

For information about Alumni in the Philadelphia area, call JEFFerson 0642. — EDUARDES S. PETZE '28, *Secretary*, Scott Paper Company, Chester, Pa. *Assistant Secretaries*: HAROLD BOERICKE, JR. '44, 5932 Overbrook Avenue, Philadelphia, Pa.; ROBERT M. HARBECK '28, Fidelity Machine Company, Philadelphia, Pa.

Washington Society of the M.I.T.

On June 14, the Washington Society declared a dividend on its spring season, which really ends in May. We were invited to inspect in detail the headquarters and shops of the Pennsylvania-Central Airlines at the Washington National Airport.

Field trips such as this are popular because of the variety they offer. We ate dinner as a group in the airport dining room facing on the runways. Right in front of our tables the airport traffic glided silently in and out. The design of the room seems to keep out the engine noises even though there are huge plate glass windows forming two walls. Most of the men made another ladies' night out of it.

After dinner Fred Moss '32, architect for P.C.A., escorted us over to the hangars, where the headquarters shop for the whole system is located. The air line had prepared for us in expert fashion. In past tours they had found us a searching group with a need for numerous guides and small parties. After a group photograph, we broke into our respective sections and followed a split-hair schedule through the plant. The air line is used to accurate timing, so as our

group finished at the paint shop and started for the propeller stand, the next group was arriving at the paint shop, fresh out of the machine shop. So it went all the evening — no trouble hearing the guide, and plenty of room for all the groups to operate separately.

Most of the planes were out making money, but there were two being overhauled, one of which had just been turned back by the Army after two years of service. The functions conducted at Washington by P.C.A. include engine overhauling and testing, painting, structural repair and refitting, maintenance of complete stocks of every component of their planes ready for issue, as well as offices and records and traffic management. Two thousand people are required to run the Washington end.

Alumni present were as follows: 1890: J. G. Crane; 1893: P. H. Thomas; 1897: B. A. Howes, F. A. Hunnewell; 1900: C. H. Stratton; 1902: H. M. Chapman; 1904: O. C. Merrill, F. W. Milliken, G. N. Wheat; 1908: H. H. Bentley; 1909: B. A. Robinson; 1911: D. P. Allen; 1912: A. M. Pedersen; 1915: A. D. Beidelman; 1916: F. P. Upton, W. E. Wentworth; 1917: J. P. Ferrall; 1919: M. P. Smith; 1921: L. W. Conant; 1922: R. H. Blatter, G. P. Brookfield, H. H. Fisk, W. K. MacMahon, K. E. Schoenherr, R. K. Thulman; 1923: S. S. Elkins, J. S. Loewus; 1924: J. E. Jackson, W. W. Sturdy; 1925: Ralph Ilsley, C. R. Mabley, Jr.; 1926: S. J. Cole, T. L. Soo-Hoo; 1927: A. K. Berle, E. G. Cowen, M. D. James, G. E. Thomas; 1928: M. W. Keyes; 1929: N. P. Stathis, Raymond Underwood; 1930: G. L. Arnold, A. F. Bird, C. W. Maskell, N. C. Nelson; 1931: E. S. Worden; 1932: W. H. Foster, S. D. Miller, F. M. Moss, R. S. Prescott; 1934: J. F. Burke; 1935: Herbert Small; 1936: C. E. Crede, G. C. Mylchreest; 1937: A. M. York; 1938: A. M. Main, Jr.; 1941: C. H. Corliss; 1943: A. H. Shairman. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. ALBERT F. BIRD '30, *Assistant and Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

M.I.T. Women's Association

The annual luncheon for 1944-1945 was held on Alumni Day in the Emma Rogers Room, with Dr. and Mrs. Compton, Mr. and Mrs. Horace W. Ford, and Mr. and Mrs. Raymond Stevens as the guests of honor. To some of the members it was pleasantly reminiscent of old times that the guests assembled, and the business meeting afterward took place, in the old Margaret Cheney Room. The principal topic of interest was the results of the questionnaire on the dormitory for women students. Dorothy Fisher read a report which was a digest of the individual reactions of the women students; Pearl Rubenstein, one representing the collective opinion of the Alumnae. President Compton spoke very briefly in approval of the idea; and the surprise climax came with Mr. Ford's announcement that it was now more than an idea: he had actually bought a house at 120 Bay State Road which the Institute would make available to the women provided the Association would act quickly; he threatened otherwise to

turn it over to the men or accept an offer of purchase already promising more than he had paid. The keys were at hand for any who wished to go and see the house after the meeting. This news, which left everyone gasping, is a fair sample of the expedition with which the Institute converts fancy into fact, as well as of its consistent benevolence toward the coeds. The reports showed comparative unanimity of desire for a cook and some sort of housekeeper-hostess, but for student government to cover management and make a minimum of rules; they also revealed the girls' disposition toward some cost-cutting co-operation in the minor duties of the establishment.

The business meeting, conducted by President Sage, concerned itself with the number and type of meetings to be held in the coming year, deciding on three beside the annual luncheon. A ballot was cast for the following officers: President, Charlotte Simonds Sage '13, IV; Honorary Vice-president, Lois L. Howe '90, IV; Vice-president, Florence W. Stiles '22, IV; Recording Secretary, Julia C. Sullivan '42, VII; Corresponding Secretary, Ruth Andrew Dean '29, IV; Treasurer, Grace G. Farrell '29, VII; auditor, Eloise Humez Evans '42, XVIII; executive committee, Pearl J. Rubenstein '38, VIII; Marjorie Pierce '22, IV, and Louise Peirce Horwood '19, VII; registration committee, Katharine Adams '44, IV, Eleanor Dean Patrick '45, IX-B, and Theodora Keith '32, IX-A; nominating committee, Elizabeth M. Dolan '34, IV, chairman, Gertrude T. Spitz '17, VII, and Leona R. Norman '41, VII.

The following Alumnae attended: Hattie L. Gates '96, VII, Susan L. Maguire '01, V, Sophie Thayer Blunt '03, VII, Charlotte S. Sage '13, IV, Frances Stern '13, V, Gertrude T. Spitz '17, VII, Gretchen A. Palmer '18, IX-A, Dorothea B. Rathbone '20, IV, Florence W. Stiles '22, IV, Marjorie Pierce '22, V, Katherine H. DeWolf '25, IV, Esther L. Frutkoff '26, VII, Ruth A. Dean '29, IV, Grace G. Farrell '29, VII, Elizabeth Rossman Everett '30, IV, Madeline I. Anderson '31, Special, Theodora Keith '32, IX-A, Alice Hunter Kimball '36, V, Pearl J. Rubenstein '38, VII, Marjorie Quinlan Swift '41, V, Julia C. Sullivan '42, VII, Adelaide A. Toombs '42, III, Mary V. McDermott '43, VII, Mary E. Elder '43, II, Betty E. Fullerton '44, IV-B, Egilda De Amicis '44, VII, Elaine M. Bickford '45, V, Carolyn D. Cross '45, IX-B, Dorothy C. Fisher '45, VIII, Frieda S. Omansky '45, IV, Mary E. Sullivan '45, XVIII, Selma C. Swift '45, XVI, Emily V. Wade '45, V. — RUTH ANDREW DEAN '29, *Secretary*, 11 Fuller Brook Road, Wellesley 81, Mass.

CLASS NOTES

1877

Your Secretary was called to Boston in June because of serious illness in the family. Being there, he attended the Alumni Banquet, where, next to C. Frank Allen '72, he represented the oldest class present.

He invited the surviving members of our Class to lunch with him at the Hotel Statler on June 23. Of the eight invited — there are nine of us now living — six answered in their own handwriting. Two were ill

and could not personally respond, but the wife of one and the daughter of the other wrote their regrets. Beeching was the only one to attend, but we had our 68th reunion after graduation.

The Secretary called the meeting to order and reported that he had received enough proxies to elect William H. Beeching of 106 Bellevue Avenue, Winthrop, Mass., as class president to fill the vacancy that had existed since the death of Charles A. Clarke in April, 1944. The meeting was then turned over to him. Two hours were pleasantly spent in chatting and lunching. When we parted, it was with the assurance that we would meet next year for our 69th reunion. — GEORGE W. KITTREDGE, *Secretary*, 592 North Broadway, Yonkers 3, N.Y.

1885

Another member of the Class has passed away, after a short illness. Arthur H. Doane, born June 10, 1863, in Middleboro, Mass., died in Chicago on July 31, at the home of a son or daughter.

After completing the four-year Course in Civil Engineering at Technology, he went, in October, 1885, to Omaha, Neb., entering the employ of the Union Pacific Railroad in its engineering department. In a letter received in December, 1935, he said: "In 1892, I was made mining engineer of the Union Pacific Coal Company, a subsidiary of the railroad company, with headquarters in Denver, Colo. In 1896, I was made general sales agent of the company at Omaha, having charge of the sales of commercial coal. In 1906, upon removal of the company offices to Cheyenne, Wyo., the duties of assistant treasurer were added. In 1921, the offices were again moved to Rock Springs, Wyo., where I continued to serve as assistant treasurer until I was retired on February 1, 1932. Since then I have returned to my old home in Middleboro, where I am trying to pick up the loose ends dropped 50 years ago."

Arthur H. Doane was always a welcome guest at our class reunions and luncheons. — ARTHUR K. HUNT, *Secretary*, Longwood Towers, Brookline 46, Mass.

1886

Since the last issue of *The Review*, death has taken two members of the Class — Louis F. Cutter, on June 26, and James E. Simpson, on August 23.

After graduation, Cutter was for many years employed in surveying and engineering work of various kinds: with the Geological Survey, making surveys for the Massachusetts state maps; with the engineering department of the city of Boston; and with the engineering firm of Fay, Spofford and Thorndike. As a member of the Appalachian Mountain Club and of the Randolph, N.H., Mountain Club, he spent many of his summer vacations surveying and mapping the trails of the White Mountain region. A daughter, Mrs. Maynard Harris of Acton, and two sons, Colonel Ammi Cutter of Cambridge and George O. Cutter of Detroit, Mich., survive him.

Simpson came to Technology from Lawrence, Mass. After graduation he joined his father in business in Lawrence. Several years ago he retired from active business and moved to Methuen, Mass., where he died on August 23. His wife,

Catherine C. McDonald Simpson, survives him. — ARTHUR G. ROBBINS, *Secretary*, 12 Grove Street, Winchester, Mass.

1887

The 58th annual reunion of the Class was held at the Hotel Statler in Boston, on the afternoon of Saturday, June 23, from three to six o'clock, when the meeting adjourned to the main dining room. Together with the representatives of three of the elder classes — Allen '72, Kittredge '77, and Robbins '86 — we occupied the table assigned to the Classes of 1868 to 1887, the senior table on the floor and directly in front of the speaker's stand. The Class was especially honored by the presence of our worthy President, Dick Schmidt, who, in company with Lonsdale Green, had journeyed from Chicago for the occasion, and also of Frank Shepard from Denver, who surprised us by appearing quite unexpectedly at the meeting. The attendance also included the local contingent, consisting of Cole, Curtis, Cameron, Tripp, and Very, making a total of eight men, seven of whom remained for the Alumni Dinner in the evening. A pleasant feature of the occasion was the tendering of greetings from the Class to Mrs. Carrie Bullard Lewis, sister of our beloved classmate Fred Field Bullard, the famous composer of the never-to-be-forgotten Stein Song, in a telephone conversation with the lady at her home at Tufts College, Medford. Your Secretary regrets to announce in this connection that Mrs. Lewis' husband, Leo Rich Lewis, a professor there, passed away suddenly on September 8 at the age of 81. Winthrop Cole represented the Class at the funeral services, held in the Goddard Chapel at Tufts College on September 11. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

The biggest event of the summer was the dinner given the Class by Fred Ellis. Here is the report by Sanford Thompson, Assistant Secretary: "Following the example of Ned Webster, and last year of Ivar Sjöström, Fred Ellis invited the Class to be his guests for dinner at the Engineers Club in Boston on July 14. Nine men were present, and 15 sent regrets. I do not dare to tell you of the wonderful menu, for fear you might faint, as did the lady who looked at the lion in the cage eating a huge slab of beefsteak. The one bar to our enjoyment was the absence of President Webster, who could not get here from his summer home, and of Secretary Collins, who was marooned on Chebeague Island.

"We swapped yarns and reminisced. The glory of the Class was best exploited by our host, who produced a bona fide letter from Ralph T. Jope, Secretary of the Advisory Council on Athletics, giving the authentic report of the most famous football team of M.I.T. The report reads, for the fall of 1887: October 26 — M.I.T. 24, Dartmouth 15, at Boston; November 5 — M.I.T. 74, Trinity 0, at Boston; November 12 — M.I.T. 52, Amherst 0, at Amherst; and November 19 — M.I.T. 24, Stevens Institute 0, at Hoboken, N.J. Fred, although weighing at that time only 119 pounds, played quarterback on the team.

"Sjöström spoke feelingly of Harry Horn and of their meeting in 1888 on the North-

ern Pacific, and of Harry's eventful life and important position in railroading. Bates said that he was only a farmer, but he is evidently a very essential one, as he is raising plants vital to the armed forces. Runkle is still running his chateau for the Navy. Instead of 18 ensigns, Johnnie now has seven naval families with their children, who apparently are having the time of their lives. Cavanagh told of his yacht, *Meemer*, and showed us a letter from his friend Horace Drinkwater, a famous yachtsman, who called her the fastest yacht ever built. Bird wrote of his two grandchildren and his son-in-law in the service. Herbert has received a certificate of 50-year membership in the American Chemical Society. Atkinson is completing his book, designed to make the study of logarithms a lovely pastime. Reynolds broke a rib last week — by the way, Fred Ellis did the same two weeks ago, but had to have it healed to attend his dinner. Merrell writes from Florida of his pleasant home and of living on his catches of kingfish, pompano, and flounder.

"Last, but not least, came Bert Collins' letter which certainly would have made our mouths water — except that we had had such a sumptuous dinner — describing his 60 x 50 foot garden, with peas, wax beans, carrots, beets, lettuce, onions, summer squash, cucumbers, and spinach. To accomplish this, he has employed a four-man contingent of the Army, stationed on the Island, whom he has also inveigled into cutting four-foot wood for his fireplace. He has trained his daughters, whose husbands are in the Navy, to bring up driftwood from the beach, which burns with varicolored flame in his fireplace. He is secretary of the golf club where the Class played on one of its anniversaries. The club is to celebrate its 25th anniversary this summer and, thanks to the Secretary's good management, has accumulated money to buy a \$1,000 war bond.

Bert also enclosed a letter from his son-in-law, Lieutenant Hughes of the Naval Reserve, giving a very interesting description of his naval assignments on a 450-foot concrete barge, which is more affectionately known as a 'crock' a 'concrete' or a 'sidewalk.' The walls of the ship are five inches thick and occasionally holes are punched in them by other ships. Repairing is done by shifting stores and putting a list on her to bring the hole above the waterline, then the men go to work — not with steel and welding tools — but with a hod of cement and a trowel! He says the hold carries hundreds of tons of more different kinds of stores than one could list in a week, handled by four light tractor cranes. They simply crawl up and down the deck hauling the material out of whatever hatch is being worked and swing it over to the boats alongside. The ship is armed, but censors forbid details.

"Those at the dinner were: Henry Bates, John Cavanagh, Arthur Conner, Fred Ellis, Charles Faunce, George Hamblet, John Runkle, Ivar Sjöström, and Sanford Thompson. Longest distant runner by mail was Frank Adams with his Air Mail from Santa Barbara, Calif. Since the meeting, a letter from his wife tells of the illness of Brigadier General George Moore in San Diego, Calif. Fred Ellis said that Sanford Thompson had offered to play host next

year, and Runkle the year after, subject to the status of Ned Webster's red ration points."

Since our last notes we have lost four classmates. Charles H. Knapp of Clifton Street, Malden, died on February 21. We had a long letter from him which was printed in these notes several months ago. He was with us only one year.

Luther W. Bridges died at his home at 273 Union Avenue, Framingham, Mass., on April 14. Mr. Bridges met with an accident in which he was severely burned and from which his death resulted. He was born in Hopkinton, Mass., on January 10, 1868, the son of Daniel Thurber Bridges and Frances (Wadsworth) Bridges. Mr. Bridges had been for many years with Charles H. Tenney and Company as a mechanical engineer. He had retired about 15 years ago and since then had devoted himself to his own place in Framingham. He and his wife were interested in flowers; they maintained a greenhouse and a considerable vegetable garden. Mrs. Bridges, the former Ella R. Wentworth, had died on January 22, 1943. Surviving Mr. Bridges are his son, Daniel Thurber Bridges '28 of Kittery, Maine, and his daughter, Elizabeth Bridges French of Framingham, Mass.

Benoist S. Redd of 430 West 118th Street, New York City, died on May 26. After three positions of brief duration, Redd joined R. Hoe and Company in 1892 as designer and draftsman, and except for a brief interlude in 1901, continued with them, in 1903 assuming charge of their electrotype hydraulic machinery, until 1915. During this time he designed the Lidgerwood boiler shop and numerous large electrotype foundries in Buenos Aires, New York, Atlanta, and Buffalo. In 1915 he became engineer with the Remington Arms Company in Bridgeport, Conn. In 1917 he went into business there as a manufacturer's representative and sales engineer until World War I, when he entered government service as a traveling inspecting engineer, examining machinery for the large powder plant at Nitro, W. Va. In 1923 he reported two years of developing inventions, a year with the Jersey City Printing Company, and subsequent work with the Talbot Steam Power Units.

Frank M. Ladd of 2208 East 25th Place, Tulsa, Okla., died on June 8. Ladd was with the Millstone Granite Company for several years, beginning in July, 1888, in the capacity of draftsman, engineer, salesman, and, finally, superintendent. From 1896 to 1900, he was general superintendent for Booth Brothers and the H. I. Granite Company, New York City; from 1900 to 1907, general contractor, New London, Conn.; from 1908 to 1916, general contractor, Denver, Colo.; from 1916 to 1923, chief building inspector, Denver, Colo. — BERTRAND R. T. COLLINS, *Secretary*, 76 Murray Place, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

1890

Our 55th anniversary, because of travel restrictions and war conditions, was limited to those within easy access of Boston; but in spite of that, 16 (or 37 per cent of our living graduates) showed up for a luncheon at the Hotel Statler on June 23.

These were Bartlett, Batchelder, Miss Bragg, Brown, Burley, Crane, Curtis, Goodwin, Greenlaw, Horton, Lenfest, Packard, Roots, Sherman, Tilson, and White. This was followed by round-table reminiscences and the reading of messages from Atwood, Cougar, Crosby, Hyde, Knight, LeSueur, Moody, and Noyes, until late in the afternoon. Then, after cocktails at six o'clock provided by Goodwin, the meeting ended, but Brown, Burley, Crane, Goodwin, Lenfest, Packard, Sherman, and Tilson remained for the Alumni Banquet. Nearly everyone looked hale and hearty — there being no overweights — and apparently good for many years to come.

There was an animated discussion of Bartlett's report of being on the scrap heap in 1922, following Princeton courses in economics in 1932 and reading the Bible in the original Hebrew today. He is now chairman of the board of the First National Bank of Webster, Mass. John Batchelder looks ruddy as ever and still rows his shell on the Charles. He told us of his visit to Berchtesgaden in his younger days. Miss Bragg brought the flowers which graced our tables. Too modest to report the kind and charitable things she has been doing, she recalled some interesting incidents of undergraduate days.

Brown, who put in three years at Technology and then got his degree from Harvard, told about designing the stations on the early Boston subways, and especially the old incline on Boylston Street. He said that he spent a great deal of time in devising entrances and exits so that a passenger could not make a round trip without paying another fare. After 1918, he turned to insurance inspection, a line he followed for 23 years until he retired.

Burley's Boston Insulated Wire and Cable Company has been very busy with war work. The German "bulge" kept him hustling nights and Sundays for replacements, and he continues to be crowded at factories here and in Canada for airplane wire and cable. With special steel and alloys, his plant has become a laboratory. Crane reports being very comfortably located just outside of Washington. Dr. Curtis was the only one present who retains really black hair and the only one whose name appears in the Army roster of World War II. On call as a reserve officer in the Medical Corps, he has recently given up practice in Dorchester, where he had lived for many years, and moved to Brewster, Mass.

Goodwin believes that he holds a record for length of active service on the Institute staff — 50 years, from 1890 to 1940. After retiring he continued to lecture on astronomy as "honorary lecturer" until the course was discontinued as a consequence of the war. He gave us an outline of some of the student and academic problems which have had to be met since our last reunion. Of the many researches being carried on for the Army and Navy, little may as yet be told. One project, however, has recently been made public: namely, the discovery of a solvent medicine for blood which preserves the hemoglobin and permits it to be used for blood transfusions weeks after it has been donated, thus saving many lives in distant combat areas. The secret of this discovery was rendering iron

atoms radioactive by means of the cyclotron. Goodwin said that Professor Fuller, Professor Prescott, and he — all now emeritus professors — have desks together in Room 3-233, where all members of the Class will be welcome when in Cambridge.

Greenlaw told of coming back after retiring and giving instruction in chemical warfare agents and teaching physics to the Reserve Officers' Training Corps at Brown. They gave him an honorary M.A. degree, the first to anyone not a full professor at Brown. He wound up with running for senator on the Republican ticket in a strong Democratic district and beating previous Republican records but not landing the job. Horton told us he has always been, and continues, active in the machinery business. He is so active that he failed to see the notice of the reunion until the Secretary telephoned him. Lenfest is this year omitting his usual trip to the West Coast. He told of enjoyable visits there in the past with Moody and others. Packard spent two months last year in Mexico and two in Canada investigating mining properties; he also did a little work on the mining of much needed strategic mica in New England. Good new mines are becoming scarce, and with the present tax situation there is little chance of making money in the search for them in the United States.

Roots looks after some charitable work and occasionally conducts services. He has been chaplain of the hospital in Foxboro and also of the Massachusetts Society of the Sons of the American Revolution. Sherman is president of the Belmont Savings Bank, but also is becoming an authority on the American Revolution and points of interest connected with it in the vicinity of Boston. He wrote a monograph, to be found in the Harvard library, on the cannon on the Cambridge Common. He finds that the oldest cannon dates back to 1696, the latest being of the time of George II. Tilson has been treasurer of two charitable corporations for 10 years. Miss Bragg accused him of walking up the street with a stool on his shoulder for use in the chemical laboratory, and he reported reviving a mouse which had been given anesthetics in the laboratory. Frank White looks with envy on those who have retired. He, too, had retired after teaching medicine at Harvard for 40 years, but has been reinstated during the war. He told us of catching a 25-pound striped bass the first time he cast in his line.

We were sorry to hear from Frank Atwood that on account of a "bum foot" he was obliged to spend two months of last winter in the hospital. He reports that he "can get around now but not too well" and went to Rockport for the summer. Cougar writes that he is engaged in raising oranges and in essential war work in California. Crosby is a partner of the firm of Hubbell and Benes Company of Cleveland and writes that he is "blessed with good health and spirits, and can sing." He says his friends "give him credit for that, those not agreeing politely keeping silent." After being a member of the firm for 31 years, he retired but upon the death of his wife five years ago resumed active participation. He was in Moscow, Russia, from 1928 to 1930 "in charge of design and construction of a large manufacturing plant and city for the

Soviet Government, erected at Nizhni Novgorod [now Gorki]." He attends the meetings of the local Technology club, of which he is the dean. Karl Hyde sent best of wishes.

Frank Knight writes that he is still able to, and does, function moderately as a supply clergyman, although he has been retired from active service for eight years, and that he is "living a quiet, rather uneventful life of reading and reflection." He is far too modest in his remarks. He tells of meeting Flint at a St. Petersburg, Fla., Technology club dinner and frequently thereafter. He closes with his "priestly blessing" on all. Le Sueur, who had sent a copy of Machado's picture in the "Technique," wired his best wishes to "all the men of good old '90." Moody sent on some pictures of the Class and his respects and regards to all. Harry Noyes sent his regrets and says that since he had a stroke two years ago he is able to get around the house but can't travel. We are glad to learn that he is suffering no pain. We certainly missed him. Willis Whitney, speaking at a General Electric Science Forum, declared that a fifth freedom should be added to the Atlantic Charter — "the freedom of scientific inquiry."

The death of Darragh de Lancey's wife in May was announced in the July Review. — Stephen R. H. Codman, who studied architecture for a time with us and went to Harvard, died on October 10, 1944. After completing his studies here, he went to the Ecole des Beaux Arts in Paris, and after that spent a number of years in travel and in study with various architects in Europe. Returning to Boston, he formed a partnership with Professor Despradelle, and they built the Berkeley Building on the corner of Boylston and Berkeley Streets. Later they built the Peter Bent Brigham Hospital, a number of commercial buildings in downtown Boston, and some attractive residences. He leaves a wife and one daughter. — The address of John C. E. de Bulle is changed to Blackstone Apartments, Baltimore, Md. — **GEORGE A. PACKARD, Secretary**, 50 Congress Street, Boston 9, Mass. **HARRY M. GOODWIN, Assistant Secretary**, Room 4-242, M.I.T., Cambridge 39, Mass.

1891

We propose to hold a Victory Dinner in December and a Victory Reunion next June. This will be our 55th and probably will be held at the New Ocean House, Swampscott. Come one — come all. Several who live at a distance have already expressed their desire to attend. Travel restrictions are over, and plenty of gasoline will be available. Details of this party will be sent you later. Harry Young will be our general chairman as at our 50th, and you know what a fine job he did on that occasion. Our record of 44 members of the Class attending has not been equaled by the younger classes, owing in part to war conditions.

The last report of the Alumni Fund shows 1891 at the top in number of contributors, with 132 per cent of our quota thereof. Having had experience with statistics, perhaps we should thank Mr. Kane for giving us a low quota to shoot at. We are, however, below par on the amount subscribed, presumably of importance. To hit 100 per cent of quota we need an increase

of \$73, a sum that would seem readily obtainable.

The following testimonial appeared in the *Hammett Herald*, Cambridge, Mass., for June: "Presented to Harry Hayward Young by the board of directors of the J. L. Hammett Company in commemoration of 50 years of continuous service and in recognition of his clear vision, successful leadership and the inspiring personal qualities which have won the respect of all." The editorial column said further: "This Company was founded by Mr. J. L. Hammett in 1863 and was the first organization of its kind to cater exclusively to educational institutions. In 1895 Mr. Young acquired the business from Mr. Hammett and from that day through his leadership he has guided this Company to become one of the largest in the industry. To him, heartiest congratulations of our entire organization for a job well done. May he continue for many more active and pleasant years." It can properly be stated that the Class unanimously agrees with all of the above. A recent letter from Harry reads in part as follows: "The board of directors gave me a surprise dinner at the Algonquin Club to celebrate my 50th year of being treasurer of the Hammett Company. It was a very pleasant affair, with the satisfaction of having, during the years between 1895 and 1945, developed the old company, founded in 1863, from a concern of \$30,000 to one of over a million dollar value and from a personnel of about 15 to 250 employees, without a strike. As general manager, also, I think I have a fairly good record, sales having increased from \$100,000 to \$2,000,000."

A nice letter from Robert Ball in Cambridge, England, dated May 14, reads as follows: "Your welcome class notes continue to come, and they merit a quicker acknowledgement of your kindness from me for the pleasure they evoke. But this pleasure is not unalloyed when the inevitable gaps in our ranks are noted. I have no recollection of Alonzo Hammond, but that is not surprising since he was with us for so short a time. He left a great memorial to his name in the Chicago Union Station, such a wonderful improvement of the terminal facilities of that great city. I can recall the statement of a citizen of Chicago that he knew of a man who said he could have bought the lot where the Palmer House stands for a pair of old boots, but the devil of it was, he didn't have the boots. Leland is well within my recollection. I could single him out from the group of stalwarts at the 50th reunion without recourse to the legend beneath.

"You refer to Bert Kimball coming to the 50th reunion from as great a distance west as the writer is east. Please remember me to him and ask him if he can recall the friendly morning sprints of two commuters (here known as season ticket holders) downhill to the Roxbury depot of the Boston and Providence Railroad en route to their daily tasks at the Rogers Building. Of Charlie Garrison I have a precious memory and a constant reminder when I turn to my bookshelves. The *Words of Garrison* occupies a place alongside literature concerning Joseph Sturge (my wife's grandfather) and William Lloyd Garrison, both ardent abolitionists and friends. The city of Birmingham honoured the memory of the former by a statue.

"I was interested in Lewis Dunham's statement that our Class was one of the last of those having a great proportion of descendants of Americans or New Englanders. It is not for me to offer any opinion on this, but conscience will not be stilled, and your correspondent (who does not come within the categories mentioned) feels that he may have been one who startled a trickle which has now become a flood! In an attempt to justify myself, I turn to the Ball family records with the following result: Colonel William Ball, who must have missed a boat (loaded beyond the Plimsoll line) by which he would have been landed in the year 1620 close to the generous gift of land made to Plymouth by Francis C. Holmes and his sister, eventually in 1650 took ship to Virginia and founded a family which made him the great-grandfather of Mary Ball, mother of George, 'the father of his country, the glory of the American people, and the pride of the civilized world.'

"Turning to the great events about us, we all feel a sense of relief. We can forget to draw a curtain without peril to our security from a bomb, and we are gradually opening up to our usual way of life; but it will be a long time before things to which we have been accustomed all our lives will appear again, perhaps never for our generation. Town planning is a very live issue here at present. As Gorham Dana well knows, there are many difficulties to be overcome, and reconciliation is not just around the corner between artists, architects, town councils, and the inhabitants, who have to use roads whether they like them or not. I am sure Gorham would put us right on many questions. Many argue that the chief charm of England is that it was not planned, but just happened, and when one wanders about the countryside amidst the record of centuries and thinks of the history behind it all, there would appear to be some substance in this point of view. Your beautiful New England is in like case. I find time for some gardening, chiefly vegetable growing. Roses are very nice, but they are not edible! We have been enjoined to turn our flower beds into rows of drills, and this we have done. I hope the need for continuance of this alternative will soon be over and that the market will be well stocked again. So far our table has been supplied entirely from our garden. We are in hopes that travel between here and East Africa may soon be restored for we have not seen our daughter since the outbreak of the war, and her husband and son, never. They are as eager to come as we are to have them."

Charlie Hanington wrote to us from Denver on September 12, saying: "The summer is fast drawing to a close, and so far everything is well with me. I have been out on two or three expeditions looking for fossils and birds and with good results. The heavy summer rains in the Church Divide have exposed what looks like a mammoth skeleton, which we covered up awaiting the return from the Army of our expert. I had hoped to see Howard this summer as he wrote me early in the season that he was planning a trip to Mesa Verde, but so far no signs of him. We have had a fine summer, with very few hot days and plenty of moisture. After rain again last night and this morning, the air is like fall. Strange to

say, but our attendance for the year is about 30,000 ahead of the corresponding period a year ago. A week ago Sunday, from noon until 5:30, we had 18,470 visitors. According to car tags, 36 of the 48 states were represented. Perhaps in the near future when rail travel is restored to normal, I may visit the East. I am getting pretty old to cross the country in a car again." (Secretary's note: We shall count on Charlie for our 55th.)

Excerpts from two letters from Charlie Ricker follow. On June 26 he wrote: "I left Havana on May 2, stayed about three weeks with my son in Arlington, Va., and arrived at Salamanca, N.Y., on May 24, and am living at the hotel where I spent most of last summer. I had to come here to attend to some business left over from the sale of the farm last December, and all my household effects and trunks are in storage here. This is a rather pretty small town with nice country around, generally cool and comfortable; it does very well for the emergency. I am walking four to six miles a day, which is much better than I could do in Havana. In due time I hope to be fit to tackle some of my old haunts in the White Mountains." On August 23 he added: "I am still plugging at my problem of self-improvement, as when I last wrote you, and have made some progress. Transportation conditions may soon have cleared up enough that I can get a look at the New Hampshire mountains, now my principal ambition. My son is still with the Office of Defense Transportation in Washington, trying to help things along a bit; but it is so hot there that I have not dared go to see him."

Gorham Dana is back from his summer home near Lake Sunapee, N.H. He is looking fine. Working in the garden evidently agrees with him. Like all gardeners he has his troubles, chiefly 'bugs.' — We have recently been notified of the death of Allan Ramsey of Cincinnati, Ohio, on April 10. The Class has had no contact with Dr. Ramsey for many years.

A letter just received from Charlie Garrison in Santa Barbara tells us that now gasoline restrictions have been removed he is up to his old tricks of running up and down the Pacific Coast. We suggest that he save some of his gas so as to drive across the country next year and attend our 55th reunion. His letter reads as follows: "Last Friday we had our golden wedding celebration. Our old friends, the Hallidays, had a garden party for us. Some 31 of our most intimate friends were present, 10 being over 80! Our son and grandson were with us, but we missed Bob's wife and daughter who were in the East as the latter is going to Milton Academy. In another week we go to Berkeley to visit our daughter for several days. With gasoline once more at our disposal, the car will carry us to many places we desire to see again, such as Oregon, Washington, and Canada, although we may not be able to cover a thousand miles a month as formerly. The last week of August we spent in the Yosemite. Bob and Rob drove us there, and we saw everything from the Big Trees to the Hetch Hetchy Dam. We covered some 1,350 miles. Remember me to all the classmates whom you see." — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

1892

Eight members of our Class attended the Alumni Banquet at the Statler on June 23: namely, Harry J. Carlson, Allen French, Edward C. Hall, John W. Hall, W. Spencer Hutchinson, Alden P. Marsh, Arthur J. Ober, and Charles E. Fuller. Letters of regret were received from Harry A. Burnham, George H. Ingraham, and William W. Locke. A very enjoyable and instructive evening was spent around the '92 table listening to the program of the evening under the direction of President Stevens '17 of the Alumni Association as toastmaster. The principal addresses were by Alfred P. Sloan, Jr., '95 for the 50-year Class, Harold and Percy Bugbee '20 for the 25-year Class, Gerard Swope '95, who was the speaker of the evening, and President Compton.

Word has recently been received of the death a year ago of Abner Pollard at his home, 564 Oakwood Boulevard, Chicago, Ill., on July 16, 1944. He attended the Institute for two years in Course IV with our Class. News came but lately also of the death of Charles O. Bourne at his home in Melrose on February 21. He attended the Institute with us for a short while as a member of Course V. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

1894

These notes are written on the last day of summer and present the gleanings of three months. The record, as must often be the case for an aging class, is one overweighted with sadness and regret, although fortunately it also contains news of men still active in their professional careers and still holding high the banner of service. In first place in our thoughts at this time is the fact that our most understanding and most beloved classmate has fallen, after a brilliant career. The news of Frank Lovejoy's death on September 16 came as a great shock even to those of us who knew of his impaired health during the past two years. Even when, just before our 50th anniversary reunion, an especially severe heart attack prevented Frank and his wife from being with the Class and forced him to spend months in the hospital, we still had faith and hope for his recovery. It was only the devotion of Mrs. Lovejoy and his physicians and his own great courage and determination that made it possible for him again to resume in a limited degree some of the business responsibilities connected with the important relations of the Eastman Kodak companies to the war effort. The strain was severe, and in the early summer he went to his farm and summer home at Henrietta.

Two pictures arise in our minds when we think of Frank Lovejoy. One is essentially personal and takes us back to student days and then through the intervening 50 years, when he was almost always present at our five-year reunions and invariably added greatly to the enjoyment of those occasions through his fine spirit of fellowship, helpfulness, and sportsmanship in all our activities. For two five-year periods he was our president. No man in the Class was held in greater esteem and affection. The other picture is of his business career, of our friend and classmate rising rapidly and successfully through various stages of responsibility until he became one of the great in-

dustrial leaders of America, and the head of the largest business of its kind in the world. His personality dominates in both these views. Whether on the golf field or the porches of Wianco or in the magnificent office in Rochester, the character of the man was the same—ever modest and friendly in bearing, high in his ideals, and ready always to champion the cause of the honest worker.

In the 47 years of his service to the Eastman Company (after two and a half years spent as chemist in the sugar and soap industries), he rose rapidly and brilliantly to the summit of the industry. A newspaper report states that when he began work at Kodak Park at \$18 a week as superintendent of the celluloid department, the plant consisted of 14 small buildings scattered over 10 acres of ground. When he had completed his great work of organization and development, there were 100 big buildings on 400 acres. It is the stature and quality of the man, however, that are most impressive. He was the third person of technical training to be employed by the company, the first having been also an M.I.T. man, Darragh de Lancey '90, who as manager had in 1895 secured the services of Harriet T. Gallup '94 as chemist and married her the following year. Lovejoy became assistant manager of the celluloid department under De Lancey in 1897, and when the latter left the company a year later as the result of a nervous breakdown, Lovejoy carried his responsibilities. The problems he tackled and solved were many, not merely in learning how to make film that would stand every reasonable test, and the elements of picture taking, but the host of problems connected with sound scientific development and employment. It was at his suggestion in 1903 that the company inaugurated a plan, then thought to be revolutionary, which resulted in steady employment for workers the year around instead of having to provide for a seasonal influx of untrained workers for the period when the demand for film was greatest. This was accomplished by so improving the film that large stocks of spooled film could be built up during the fall and winter in anticipation of the summer demand. The plan was a daring one, involving great risk, but was a complete success. In all stages of his career Lovejoy maintained a strong feeling of responsibility for his employees and their welfare. This attitude was expressed in a guidebook given to new employees several years ago in which he said: "Our company has always taken it for granted that every person employed in industry desires fair wages and hours and good working conditions. These the company has long sought to provide. Another equally important need of every man and woman who works for a living is a steady job. This need the company has always tried to meet so far as it lay in its power. Furthermore, it is taken for granted that everyone employed by the company, in whatever capacity, wants a square deal. It is in the spirit of a square deal that the company endeavors to carry out the long-standing principles set forth in its code of industrial relations. By a square deal we mean this: We expect that all those in the company's employ who exercise supervision over the work of others shall endeavor at all times to treat those under their direc-

tion as they themselves, under the same circumstances, would rightfully expect to be treated if the positions were reversed." This spirit explains why men liked to work for Eastman Kodak. It also explains the respect employees felt for Lovejoy as indicated by the fact that, when his body lay in state in the church during the forenoon preceding his funeral, more than 5,000 employees passed before his casket to get a last look at their greatly beloved employer. In another part of this number of *The Review* will be found an account of his career, emphasizing particularly the great service he rendered to the Institute. Every member of the Class will feel proud of this exceedingly great, but quietly performed, contribution to the development and prosperity of our alma mater. Again it was characteristic of the man.

It is impossible to quote all the many tributes to Lovejoy that have come to hand. A few will give the general tone. One man who worked intimately with him for many years wrote: "Character is responsible for everything Mr. Lovejoy has accomplished. I have observed him in a great variety of situations and under great difficulties and have never seen him make a decision in which his principal thought was anything but to decide fairly and rightly and decently." Another stated that when Mr. Eastman engaged him to work for Kodak, the founder's only comment on the existing Eastman organization was: "You will like Lovejoy." Another: "The interests of the Eastman Kodak Company always came first with Mr. Lovejoy, and his own convenience and desires came second. It was a marked characteristic of him that he did things to his own personal disadvantage when the company could benefit thereby. He was liberal in giving money to people and to charities. Many of his benefactions are not publicly known; but even before taxes were high, he gave a tenth of his income away. He had great patience. People took his energy with affairs that were not his business, and yet he gave his time to these matters from pure kindness. His opinions were always impartial, never personal. In a heated business discussion, he had the ability always to step in with a remark that brought the discussion up to his own broad, high level." Lovejoy's rise in the company was chronologically as follows: 1897, superintendent of celluloid department; 1899, assistant manager, Kodak Park Works; 1900, plant manager; 1906, general manager of all manufacturing departments, and a director of the company; 1919, a vice-president; 1925, general manager; 1934, president and general manager; 1941, chairman of the board. In 1900 he evolved the method of producing film in strips several feet wide; and by improvements in quality and uniformity and by new economies through quantity production, the company was enabled to meet the tremendous demand, including those of the motion-picture industry.

The honors which came to Frank are elsewhere recorded, but it is desired here to quote the citation accompanying the presentation of the Civic Medal awarded him in 1941, read by the Mayor of Rochester: "To Frank William Lovejoy, industrial leader and responsive citizen; graduate of . . . Technology; doctor of science, Lawrence College, and doctor of laws, Colby

College; successful as chemist, engineer, and business executive; because you have been a just and prudent manager affecting the livelihood of tens of thousands and giving pleasure and profit to many millions more, thereby ably carrying on the life work of George Eastman; because you have risen through your own meritorious efforts, and today are an energizing influence in our city, a trustee of our university, and because your firm has given the museums of the world and other institutions of record an accurate and reliable means of preserving the face of facts and the appearance of men and things, and because of yourself; we have elected you the civic medalist of Rochester for the year 1941."

When Lovejoy had time, he indulged in golf and in shotgun shooting. He was a member of a gun club in Rochester, the members of which are from all walks of life. He obviously enjoyed associating with these men interested in shooting, and one with whom he seemed especially to enjoy himself was a steam shovel operator. This is but one instance of his possession of that rare ability to find the common touch with humanity that would make the whole world kin.

One of Lovejoy's greatest interests centered in his family life. Family ties meant very much to him. In 1907 he married Florence Fuller of Springfield, Mass., and four children were born of this happy union, of whom two sons, Frank W. Lovejoy, Jr., a physician now serving in the Navy, and Frederic Fuller Lovejoy, a sergeant in the Army, engaged in photographic work, now survive. A daughter, Harriet, died some years ago; and a son, George Lyman Lovejoy, once a student at M.I.T. in the Class of 1934, died suddenly in London in 1931 while on a vacation trip with his father. To the surviving members of the family the deepest sympathy of all is extended by the Class. We can truly share in their sorrow, and also in the pride they must feel to have been a part of so great a personality.

Three other deaths must also be reported. Herbert E. Hewitt, senior partner in the architectural firm, Hewitt, Emerson, and Gregg of Peoria, Ill., died in October, 1944, and no details of his career are at present available. Hewitt joined our Class in the second year and left before completing the Course in Architecture. He worked in his profession for 15 years and then returned to Technology and received his S.B. degree with the Class of 1911. Harry Gardner, once his classmate and later his teacher, held a high estimate of the quality of Hewitt's work.

Howard E. Whiting, a member of our Class in its first year and later a student at Harvard, died on June 12. Another graduate in architecture, Burt S. Harrison, died in New Brunswick, N.J., on August 17. Harrison was for several years associated with Cass Gilbert, the noted New York architect (M.I.T. '80)—a time during which he acted as consulting engineer on the St. Paul, Minn., state capitol building, the New York Customhouse, the Grey Nunnery, Montreal, and other municipal buildings in the East. He later became especially well known in the field of air conditioning and was associated with one or more engineering firms specializing in this field. Unfortunately it has been impossible to

deal fully with his career, although it was an important one, as he never answered class letters or sent information to the Alumni Office. It is of course inevitable that the necrology of the Class must increase with the passing years, when we have all well passed the traditional three score and ten.

We may now turn to the more cheerful type of items which bring news of our fellows who are still "going strong," and of their children. Only yesterday brought an event which gave the Secretary not only an item but a great pleasure. Alan Clafin called up to announce that Harold Chase was in town and that lunching together followed by a visit to the Institute was the order of the day. As far as we could recall, it was the first meeting of Chase and the Secretary since graduation, although occasional contact by mail in the intervening years had kept our friendship warm. An enjoyable lunch as Clafin's guest renewed the personal touch, and the years seemed to fall away. After lunch Chase and Clafin had a fine visit with Professor Schwarz '23 inspecting the new textile laboratory, in which H. M. was much interested, and this was followed by the business of an hour or so of talk in the Secretary's office. Chase, as lean as in the old days but with whitened hair, and a few wrinkles, looks strikingly as we knew him of old except for the added maturity. He has lost none of the keenness of mind, the blueness of eye, or the interest in scientific developments. His special interest is in textiles, for he has been in the cotton textile and dyeing industry since graduation, first in North Carolina and for nearly three decades in Virginia. Now, as director of research in the great Riverside and Dan River cotton mills at Danville, Va., he holds a high place among scientific textile men. He began service as chemist at these mills, now the largest cotton mills in the country, in 1917 became chief chemist and superintendent of dyeing, and for some years past has been director of research. As these mills carry cotton manufacturing through all stages from raw cotton to the finished fabrics, his problems have wide range and give full play for a research director of his superior ability. Our talk was not all of research or education or business but also invaded the realm of our preferred recreations, among them fishing, and especially trout fishing. For many years Chase has been an ardent fisherman and, when he could get away from his work, has not only whipped the streams of the southern Appalachians, but on numerous occasions has made forage into the wildernesses of Northern Quebec and Ontario, and on lakes and streams flowing into Hudson or James bays. Sometimes he has pioneered on streams and lakes generally unknown except to the trappers and guides of the Hudson Bay Company. His other principal outdoor recreation has been shooting. Naturally a great student, he reads widely in many fields, both in science and literature. As may be assumed, we three had a most enjoyable meeting, and it was certainly a pleasure to have Chase here even for so brief a stay. Had time permitted, we should have tried to get the other '94 men near Boston to join us.

A very short letter from Horatio Parker early in September brought the simple statement that on October 15 he was to re-

tire from the position of director of the food and laboratory division of the health department of Jacksonville, Fla. A clipping from a Jacksonville paper, which he kindly enclosed, gave a somewhat more elaborated account, extolled Parker's fine work, and spoke of the "extreme regret" of the health commissioner and other city officials that Parker now wished to retire. The clipping was too long to quote in full, but it was clear that his retirement is sincerely regretted in that community. His service to the city has been outstanding. Entering the department as chemist and bacteriologist under the then city health officer on May 9, 1918, Parker has built up the food and laboratory division of the health department until it is one of the best. One of the commissioners, in speaking of Parker's work, said: "He has done a marvelous job in our midst and his loyalty, ability, and courage deserve the commendation of every man, woman, and child in the city." Another commissioner stated that he wanted it to be placed on the minutes of the meeting that "as far as the record made in this city by Dr. Parker is concerned, I don't think that there is a single thing that can be added to his fame." Other comments by officials are equally laudatory and lead one to the belief that Horatio has done a good job. Anyone who has known of his work in Jacksonville and of his services in the American Public Health Association and in the other sanitary science organizations with which Parker has long been connected will need no further proof of his administrative success or his service to the city. Many years ago Parker wrote a book on city milk supply which was the most comprehensive and practical discussion of the subject that had been presented and has ever since remained one of the useful books in this field.

It would be of interest to know how many sons of classmates have received special honors for their war services. Captain Philip W. Clafin, son of Alan, is one of them. He was awarded a certificate of merit "in recognition of conspicuously meritorious and outstanding performance of military duty" as assistant security officer in the theater of operations during the period May 14 to June 8, 1944, that is, just before and after the Normandy invasion. His citation states that "he displayed great skill and initiative in accomplishing the many liaison, administrative, and supervisory details in assisting to establish and maintain a security organization to prevent leakage of information to the enemy. He rendered an outstanding service to the mounting of the assault and build-up forces for the assault on the European continent." Your Secretary was greatly pleased, early in September, to learn that his son, Robert S. Prescott '32, had been awarded a certificate of merit for meritorious civilian service to the United States Navy for his outstanding contribution to the development of critical ordnance material during his four years of work at Pearl Harbor and the Naval Ordnance Laboratory in Washington. There are probably several other sons of '94 whose work has been similarly recognized, for there are many of them in Army, Navy, or civilian war work.

At the fall conference on employment held in Boston on September 20 and sponsored by the Boston Committee on Economic Development and the Wellesley

Summer Institute for Social Progress, Henry E. Warren, President of the Lombard Governor Company of Ashland, presided at the afternoon session. According to a press statement, he is reported to have declared that what industry needs is a "governor" to prevent speeding up into overproduction and slowing down into depression, and that some form of governmental control as practiced in wartime might be worth while to check overproduction. He said he doubted whether industry itself will voluntarily exercise the necessary control. As a business executive of great sagacity and breadth of thought, Henry's opinions are always worth listening to and considering seriously.

C. G. Abbot, although retired as secretary of the Smithsonian Institution, still continues his productive career in science as a research associate. Two important papers have just reached the Secretary's desk and bear new witness to Abbot's activity. One paper deals with the construction and use of a sensitive radiometer; the other presents a painstaking study on the correlations of solar variation with Washington weather, and suggests that certain predictions of heavy rain, frost, or drought may be made by observations of solar radiation.

W. H. King, still active in law work, reports that his daughter, Patricia, is now matriculated in the first year of the Boston Museum of Fine Arts School. We hope her being in Boston means frequent visits from Billy and his wife.

As a final note, it is a pleasure to record that in the Alumni Fund report as of August 31 we have first place in the percentage of the quota established for the classes — let's keep it up! — SAMUEL C. PRESCOTT, Secretary, Room 3-233, M.I.T., Cambridge 39, Mass.

1895

One of the great events in the memories of the Class has passed into history. This event was the 50th reunion held at the New Ocean House, Swampscott, Mass., on June 22 and 23. Although the war was still in progress, 32 men answered the call. Nearly all the class members wanted to attend, but some were prevented by sickness, distance, and the obligations which they felt they owed to the war effort. During the past 20 years reunions had included the ladies, but this 50th reunion was stag — strictly stag. It differed from those of previous years in that the great desire "to hold hands" and "look into one another's faces" precluded any thought of having the ladies around. The weather was perfect; the shores of the Atlantic Ocean being swept by invigorating sea breezes and making, with the warmth of the sun, an ideal setting in which to recite to one another the events of the past 50 years.

Your Secretary had planned to be the first on hand to start the greeting and accordingly registered Thursday night, only to discover that Eddie Alden, with Mrs. Alden, had already arrived. Gradually, one by one, the clan assembled, most of them appearing early Friday morning so as to be on hand to greet Dr. Compton, who was to call on the Class in the afternoon. This honor was much appreciated and will be long remembered by the fact that all items of discussion or tall stories were off the

record. Prexy, too, came stag, and from the time of his arrival to his departure he was plain "Doc Compton"! We were fascinated by his human touch, and this informal call will be cherished in the memories of all who were fortunate enough to be present. On display during Friday were class exhibits consisting of class books, former photographs of the Class and of all previous reunions, statistical records such that any questions on facts and conditions in past years could be answered. Also shown was an original brochure sent by one Frank Bird Masters, and dealing with his hobbies. Chronologically classified, these included locomotives, perspectives, dynamic symmetry, three-dimensional drawings, and pictorial maps. They evoked considerable interest. Even Dr. Compton grinned after perusing the booklet and asked whether or not any of those present had memorized the formulas. One of Frank's famous freehand sketches (in black) of himself was included. This outfit was the first and only one of its kind the Class has ever seen. Although arrangements had been made for the class photograph, for some unknown war reason the operator did not appear; but through the efforts of Miss Duffy, genial and efficient assistant manager of the hotel, a local photographer was secured, and the famous picture was snapped at 6:45 p.m.

Since by this time everyone was hungry, dinner was announced at seven o'clock. Al Sloan, Class President, called the group together, and before we began to enjoy the repast, your Secretary offered a toast — "To those who are absent, as they are no more; to those who wanted to come but could not; to those who are present — blessings on all of them, and best wishes to all the living of the Class of 1895." We then ate, and what a splendid menu we had in spite of the strictest rationing! After the dinner, Yoder gave his statistics, as compiled for the occasion. The oldest man present was Perley Gilbert, from Lowell, Mass.; the youngest was Al Sloan of New York. Ed Barry had traveled the longest distance, from Alameda, Calif.; and Walter Hall had come the shortest, from his home in Swampscott, Mass. Allison Owen came from New Orleans for his first reunion with the Class in 50 years. Some of the boys who live in the South and the far West were confronted with the problem of abiding by the travel restrictions, but a few "sneaked through." Far be it from your Secretary even to think of counting the number of those who came in spite of everything. Eugene Clapp was scheduled to attend but serious illness prevented. Gene is much better now. We passed the hat to reimburse the class treasury for the next five years, and really it was a grand success. Then came the highlight of the evening. Sloan asked each man to get on his feet and recite the story of his last 50 years. Attempts at oratory being strictly taboo, plain and simple narratives poured forth from everyone. Such facts are, of course, off the record, but shouts of laughter and applause increased as the program advanced. Some few had no children; others, from one to seven; some a grandchild, while another had, or expected, a great-grandchild. The following attended the dinner: Louis Abbot, Alden, Ballou, Barry, Barrows, Bourne, Sid Clapp, Churchill, Crane, Fred Cutter, Fuller, Gilbert, Walter Hall, Harris, Hayden, Hunt,

Jackson, McManus, Meserve, Nay, Owen, Parker, Richards, Shepard, Sloan, Swope, Tillinghast, Tucker, Watkins, Wiggin, Winkley, and Yoder.

On Saturday morning we journeyed to Boston to the Class Day exercises, held in New England Mutual Hall, on the site of old Rogers, where Al Sloan, as president of the 50-year Class, gave his eleven-minute talk. In the evening we attended the Alumni Banquet at the Hotel Statler. On hand were Alden, Ballou, Barrows, Sid Clapp, Crane, Fred Cutter, Fuller, Gilbert, Haffenreffer, Harris, Hayden, Hunt, Jackson, McManus, Meserve, Nay, Owen, Parker, Richards, Sloan, Swope, Tillinghast, Tucker, Watkins, and Yoder. Haffenreffer, Sloan, and Swope sat at the head table, but the rest of the boys were as prominently seated two feet below, on the main floor. We all donned the striking red paper caps, and with the three-inch identification cards and the '95 on our caps, we looked pretty good. The lads of '95 at the head table were likewise adorned. No one could mistake the "young 50-year Class." The only casualty reported was the dumping of an overflowing soup tureen on the tropical white suit of Allison Owen. The gracious hotel management eventually restored the original white glamor of the garment.

Al Sloan presented to Dr. Compton for the Institute our 50-year gift, a Class of 1895 memorial scholarship fund, in the form of a check for \$25,000. Full approval was manifest in the great applause. Gerry Swope was the guest speaker and gave a good account of himself. His topic was covered elsewhere in the July Review. A few attended the baccalaureate sermon on Sunday. The graduating exercises were held Monday morning and attended by 26 of the Class. Bigelow, Dean, and Charley Adams were found in the group. Dean and Bigelow looked as young as ever; it was good to see them. At one o'clock the Class enjoyed the luncheon given at the Algonquin Club by Dr. and Mrs. Compton. This was one of the pleasantest features of the Boston activities.

That there could be no better way to perpetuate the memory of our Class than by the establishment of a living memorial had been the final conclusion from a census of the membership, and its consummation was planned as the crowning event at the celebration of the 50th class reunion, during June, 1945. It was a bold undertaking, but with the united effort of the class members a purse of \$25,000 was raised to establish the 1895 memorial scholarship fund. The rank and file of the Class responded most substantially, but only through the underwriting of the plan by mates Swope and Sloan, was the goal attained. The Class is deeply indebted to all who subscribed, and especially to the several loyal members who finally made the memorial possible. The memorial provides as follows: "The Class of 1895 hereby gives to . . . Technology, the sum of \$25,000 on the occasion of the 50th anniversary of its graduation from the Institute . . . to establish the Class of 1895 Scholarship Fund, the principal to be invested and maintained intact and the income annually to be used to provide scholarships for suitably qualified descendants of members of the Class of 1895. If, in any year, the total income is not required for

this purpose, the balance shall be added to the Technology Loan Fund. This will constitute a living memorial of the Class of 1895." The following subscribed to the memorial: Louis A. Abbot, Charles M. Adams, Edwin C. Alden, Harold K. Barrows, Latimer W. Ballou, Edmund D. Barry, George L. Bixby, Robert W. Carr, Charles P. Cooke, John Winfield Cooke, Eugene H. Clapp, Sidney K. Clapp, Luther Conant, Henry M. Crane, Fred B. Cutter, George A. Cutter, Arthur D. Dean, Judson C. Dickerman, Fred W. Draper, Andrew D. Fuller, Perley F. Gilbert, Rudolf F. Haffenreffer, Frederick W. Harris, George W. Hayden, Samuel P. Hunt, Henry A. Holdrege, Henry D. Jackson, Ralph R. Lawrence, Dorville Libby, Ernest S. MacGowan, Frank B. Masters, Charles A. Meserve, Allison Owen, Winthrop D. Parker, Frederick L. Richards, Samuel S. Sadler, Alfred P. Sloan, Jr., William B. Stork, Gerard Swope, Charles F. Tillinghast, Edward A. Tucker, Joseph E. Walworth, Willard H. Watkins, Thomas H. Wiggin, William H. Winkley, Luther K. Yoder, and Henry Yoerg.

At this time it is appropriate to record the following gifts by Alfred P. Sloan, Jr., and Gerard Swope, as announced by Dr. Compton at the Alumni Dinner. Swope made a contribution of \$100,000 to set up the Gerard Swope Graduate Fellowship Fund. Sloan made the gift of \$350,000 to endow a professorship in industrial management. These wonderful gifts demonstrate beyond a doubt the splendid interest and spirit of loyalty to our great institution.

The passing years take their toll of the class membership. We regret to report the recent passing of Coddington and Kotzschmar. Harry P. Coddington passed away at his home in Westthempstead, Long Island, N.Y., on August 16. Harry had not been in rugged health for some time, and his last message to your Secretary was very doubtful whether he could attend our reunion. After leaving Technology, he started in the hotel business under General Wentworth. Upon the burning of the Hotel Raymond at Pasadena, Calif., he abandoned this work and went with the Forbes Lithograph Company in 1896 and continued in this service for many years, having been located in Philadelphia, Washington, and New York. During World War I, he handled the large contracts for the manufacture of posters for the government, including the Howard Chandler Christy posters, issued for the various Liberty Loans, and the poster for the Victory Loan entitled "Americans All." This was the largest issue of any one single poster during that war. He was a member of the Delta Kappa Epsilon fraternity.

Rear Admiral Kotzschmar (retired) lived at the Congress Hotel, Portland, Maine, after his retirement, and it was there he passed away on September 3. After graduation, Herman had entered the Coast Guard as a second assistant engineer and served through all the grades and on practically all the stations and duties from Maine to Texas and from Lower California to the Bering Strait. From 1905 to 1913, he served as assistant to the Engineer-in-Chief, at Washington. During the Spanish-American War, he was attached to the U.S.S. *Manning* on blockade and dispatch duty in Cuban

waters and was present at the battle of Santiago. During World War I, he was on duty in the Gulf of Mexico. Early in 1918, he was ordered to the U.S.S. *Androscoggin* for patrol in the North Atlantic, operating out of St. John's, Newfoundland. He continued in this section until the Armistice. During July, 1927, when your Secretary was fortunate enough to make the trip to Alaska, he met Kortschmar in Seattle, Wash., where he then had headquarters, and we lunched together. Had it been possible to remain in Seattle longer, your Secretary would have been granted the privilege of "sailing" in a Coast Guard cutter along the shores of the Pacific. In any case, this contact was memorable. Those who were in Kortschmar's section at the Institute will recall his remarkable ability to memorize various formulas. One day he placed on the blackboard a certain formula exactly as it was written in the book. Lanza looked at it and then asked Kotch to write it backwards, which he did, to the amazement of Lanza and the class.

We are glad to report that John Williamson Cooke, lately of Erie, Pa., and now at home with his sister, Mrs. Welt, in Belleville, Mich., has overcome his very serious illness and is able to be about again. — From a newspaper clipping we learn the following: "The General Electric Company announced the setting aside of a sum of \$400,000 to assist in higher education and fundamental research in any scientific or industrial field. It will be known as the Gerard Swope Foundation. Income from the fund will be utilized in granting scholarships to employees and to children of present or former employees, or anyone deemed worthy of assistance."

Gerard H. Matthes, on his request, retired from government service on September 30, when he relinquished his directorship of the Waterways Experiment Station at Vicksburg, Miss. His retirement age occurred during the critical war period, but he stayed on the job to direct the important tests for the armed forces, flood control, and navigation projects essential to the successful prosecution of the war. He writes that he and Mrs. Matthes are radiantly happy to be able to head for New York, where there are many friends and they will also be nearer to M.I.T. He was sorry that he could not attend the reunion, but with secret war jobs on his hands that was out of the question. War jobs are still on at the laboratories. Next time, this country will be prepared. He tells of an organization of 500 men and women, which includes 120 colored laborers, most of whom are skilled, also craftsmen in practically every vocation and trade. They make their own gadgets, build their own buildings, and stand ready to take on almost any problem that turns up. He intimates that it is time for a Corps of Engineers officer to take the reins. Referring to his twin, François, Gerard reflects that François, still hard at it, doesn't know when to quit. Gerard's temporary address in New York will be in care of the Secretary, American Society of Civil Engineers, 33 West 39th Street, New York 18, N.Y.

We must not overlook the progress of the Alumni Fund. Our Class has a fair record, but it could be a little better. Of its contributors quota 89 per cent are subscribing; this is equivalent to 71 per cent of its dollar

quota. If there is anyone who has not subscribed, and is able to and *will*, let him do it now. It is not too late. Whatever may come and whatever may go, may all of the Class look forward with courage to the next reunion, the 55th in 1950. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

As always happens after the lapse of the usual summer vacation period, a considerable grist of material becomes available for the first issue of the fall. The Secretary uses the term "usual vacation period" advisedly because during the war the Institute has run steadily on the basis of three terms with no summer vacation, and since the Secretary has been teaching continuously since 1943, although he frankly confesses that he had a very light teaching load, he has not been away on any extended vacation. He has been able, however, to arrange his classes to permit long week-end visits to the old Locke homestead in Rye, N.H., every two or three weeks, and thus in the course of a year a considerable amount of vacation time is accumulated in brief spells. With the abandonment of the rationing of gasoline, the Secretary cut loose on a long pent-up urge for an automobile trip, and for five days, starting September 9, he went on tour with a graduate student in mining from South Africa as his companion. The objective was a visit to the now active old copper mine and mill at South Strafford, Vt., and the mining and milling operations on iron, titanium, and garnet ores in the Adirondacks. In five days the trip rolled up a total mileage for the car of 622 miles, which was about equal to the mileage the car had been making in two months during the rationing of gasoline. One very pleasant feature of the trip was that our classmate Professor Emeritus E. C. Jacobs, state geologist of Vermont, joined us with his car in Vermont, and was thus able to learn something of ore occurrences and mining and milling operations in the Adirondacks, and incidentally get to appreciate Adirondack scenery, and especially some of the characteristics of cross-country Adirondack roads. Jacobs said that he had been on the go much of the summer in connection with his duties as state geologist. He had even traveled as far as Canaan, Conn., to see the operation of producing magnesite from dolomite by the ferrosilicon process. In spite of his travels, he has been able to get in considerable time with Mrs. Jacobs at their camp on Lake Champlain and enjoy the renewed pleasure of sailing his boat on the lake.

Rockwell, our Assistant Secretary, went off with Fred Damon early in June for another fishing trip at Spencer Bay on the east side of Moosehead Lake in Maine, the results of which were reported as most satisfactory. Rockwell also made his semi-annual trip in August to Harriman, Tenn., and he reported that one morning on his way South he entered the diner for breakfast and upon looking around recognized Billy McAlpine. The result was that before Rockwell had to leave the train at Knoxville at about 1:00 P.M., he and Billy had an old talkfest. Billy, as one of the United States Engineers, with headquarters in Washington, was on his way to Vicksburg, Miss., and from there was going to Beau-

mont, Texas. His immediate purpose was to review some engineering hydraulic problems which, in Vicksburg, had to do with the Mississippi River and its levees, and in Beaumont, involved consideration of the dam and irrigation problem, in which the city of Beaumont and the state of Texas were to assume the greater part of the financial obligation and the Federal Government was to give its approval and supply what considerable proportion might be necessary to complete the project. The purpose of the dam was to benefit the rice industry of Texas. Rockwell said McAlpine looked very fit and was still streamlined and still playing tennis, a sport which he has always enjoyed with considerable success. Instead of his former tireless hours on the tennis court, however, he has now learned that he must slow up a bit and seldom plays more than three sets at any one time. In spite of being able to achieve less court coverage with this necessary curtailment of energy, he is still a formidable adversary because of his skill in placing his shots and his ability to determine the style of his opponents. He said that he saw Marshall Leighton occasionally in Washington but had not had much contact with other members of the Class. Rockwell extracted a promise from him that he would attend our 50-year reunion next June, and furthermore, said that he was much interested in helping the Class make a significant contribution to the Alumni Fund at that time.

The present indications are that with the ending of the war and conditions getting back to normal, a big M.I.T. reunion, corresponding in form to the pre-war Alumni Day observances at the time of June graduation, will be pulled off in the early part of the month of June, 1946. This means that the 50-year reunion of our Class will be set to correspond with this all-Technology affair, and due notice will be sent to all classmates a little later on, as soon as the date of the M.I.T. affair has been definitely set, probably around the week end of June 9 or June 16.

The matter of the form of the 50-year gift from our Class next year has not been finally settled, although the consensus of opinion received to date indicates that special effort should be made toward increasing the contributions of classmates to the Alumni Fund in 1946. Some have suggested that we should set the goal at 100 per cent contribution, making every effort to get a gift from all individual members of the Class, even though in some cases the amount would of necessity be small. Charlie Tucker has made the fine proposal that, since we were the last class graduated under President Walker, it would be excellent to designate our 50-year Alumni Fund contribution as a memorial gift in the name of Francis Amasa Walker. Perry Howard has advanced the idea that, instead of the regular form of Alumni Fund giving in 1946, our Class might designate our contributions in our 50th year for permanent funds of the Institute with the income only to be available for use. Perry, however, does not insist upon that procedure and will be perfectly happy to go along with whatever decision classmates may make. Incidentally, on the day that these notes are being written the Secretary happened to meet Howard at Kendall

Square, Cambridge, and learned that last spring Mrs. Sager had been visiting Boston from New York and had telephoned to Mrs. Howard. But this does not obviate the placing of another black mark on the record of Lawrence Sager because of his failure to acquaint Boston classmates of the proposed visit of Mrs. Sager to Boston.

At the Alumni Banquet in the Hotel Statler on June 23 classmates present were Driscoll, Grush, Hersey, Howard, Locke, Rundlet, and Young. Henry Jackson, whose allegiance to M.I.T. we share with the Class of 1895, was seated at the adjacent '95 table. Damon and Rockwell were not in attendance because of their fishing date in Maine from June 16 to 26, as previously noted. That trip was one of splendid weather in Maine in sharp contrast to the miserable weather with which they had been greeted on their earlier trip last spring. Rundlet reported that he was still being kept at work on his old job in the Custom House, after having been called forth from his retirement when a need for men arose with the coming of the war.

The Secretary has been unsuccessful so far in relocating two classmates reported lost by the Alumni Office, William F. Allen and Alfred D. Conant, and if any of you have knowledge of the present whereabouts of either of them, the Secretary will welcome such information. The last address we had for Allen was 2526 West Argyle Street in Denver. The officers of the Rocky Mountain Technology Club have co-operated wholeheartedly in efforts to locate Allen, but the trail ends with the report from his former employers in Denver, the Weicker Transfer and Storage Company, that Allen and his wife left Denver for California a year ago and that nothing has been heard from them since. The last address we had for Conant was Apartment 105 at 5244 Melrose Avenue, Los Angeles, Calif., but he is no longer there. The Plainfield Trust Company of Plainfield, N.J., had dealings with Conant for years, but those connections have now ceased, and furthermore Conant's brothers and sisters do not hear anything from him and have no idea where he has gone.

Among the bright spots of the summer have been several communications from Victor Shaw and Con Young. Vic reported that he was still enjoying quiet and peace in his comfortable quarters in the hills near Lake Hughes, Calif., and that his activity was keeping him in excellent health. His time was occupied in writing, outdoor life, and hiking one and a half miles for mail. He was hoping to get in a prospecting trip to Arizona during the coming winter. Shaw also wrote at some length regarding Russell Porter, telling how they had been old camp mates on two Peary expeditions to the North, how they had hunted together in northern Maine, had camped on the Bras d'Or Lakes in Cape Breton, and had had other times together. He stressed particularly the fine work that Russell had been doing in Pasadena on the 200-inch Palomar telescope which had engaged his attention ever since it was designed and started years ago. Vic understands that Porter designed and superintended the construction of the buildings which are designated as the Observatory and buildings which include all structures housing the telescope and the facilities connected there-

with. Porter planned and landscaped the final site for the observatory on Mount Palomar, but from Vic's viewpoint perhaps the biggest accomplishment is the wash drawings of every part of that intricate telescope, with cross sections, all of which are of a size of eight by ten feet and are to form a frieze around the lecture room in the hall. Porter's ability as a master hand with the brush in water color, and also pastel, made him admirably fitted for this work. He also composes symphonies and has a tiny white piano in his bedroom. More recently, since Pearl Harbor, Porter has been working with other members of the staff on new prism material connected with the eyepieces of all precision instruments used by the armed forces. Porter's health has not been too good during the last three or four years, possibly the aftermath of the tough time he had in the Arctic on Franz Josef Land years ago. That experience undoubtedly had some effect on his heart and contributed toward making him somewhat hard of hearing.

Con Young, at the time of Alumni Day in June, gave the Secretary the pleasure of lunching with him, and a great many things were discussed. In addition, Con during the summer has favored the Secretary with several of his most interesting and newsy communications telling stories of his past experiences and existing conditions. He supplied full details of the effect of the hurricane last September on the trees and house on the Cape, which fortunately caused no permanent damage, and also from Con's viewpoint gave him some benefit in the way of providing him physical exercise in preparing for firewood the trees which had been felled by the hurricane. He told also of the trials and tribulations of their life on Cape Cod during last winter, when they could not go to Florida according to their annual custom. The hurricane also left some water problems for which Con was seeking advice from scientific specialists. Fortunately, his house was built sufficiently high so that not a drop of moisture has ever come into his cellar. Con and Abby are most happy over the end of the war because, unless something unforeseen occurs, it will mean that they will journey by auto to Florida when it begins to get cold on Cape Cod and will again bask in Florida sunshine, awaiting the time when it will be warm again in the spring for them to return to Cape Cod. Among other things Con supplied a complete story of summer garden results, which on the whole were most satisfactory, including especially a most generous supply of golden bantam corn which went from the garden to the teeth in less than an hour and was designated by Con as some treat.

Irv Merrell wrote Con Young from St. Petersburg, Fla., the last of June that he and Mrs. Merrell had both been going through a period of poor health, but were both on the mend. The Merrells were looking forward to the coming of the Joe Clarys as permanent residents of St. Petersburg. They reported also that the hurricane which struck Florida in June did no damage to St. Petersburg, but on the contrary brought a large quantity of much-needed rain, amounting to two inches, in the form of a slow drizzle, so that it did a lot of good and broke the drought. They had not previously had a good rain since January. Con

Young also received direct information from Joe Clary the last of July. Joe and Mrs. Clary had gone to St. Petersburg by train in June to get their furniture into their new southern home, and he was unfortunate enough to pick up some type of germ which started a fungus growth about his face and head. They came back to Washington to be on hand for the arrival of a new grandson on July 9. This was an 8-pound 2-ounce boy born to their daughter Elizabeth. After the birth Joe made a quick trip to Boston to see his only living, elderly sister in Roxbury, but the Secretary neither saw nor heard anything of him on that trip. On returning to Washington, he found that he would be allowed enough gas to take his automobile to St. Petersburg by the shortest route. They left on August 8, taking the steamer to Norfolk, whence they made the long motor run to Florida. The last report was that the infection was entirely under control.

Finally, through a letter received by Con, information is secured on Lou Morse and his family. He and Mrs. Morse became grandparents again the last of March by the arrival of a new grandson, John Woodworth Hertzler. Their son Louis '31 was a senior grade lieutenant in the Navy at Newport, R.I., in charge of production control at the Torpedo Station. His efforts to obtain sea duty, for which he had prepared himself by special courses in navigation and gunnery, had come to naught, as the officer in charge had denied his requests because he was doing such a satisfactory job. His wife and two children have continued to live in Detroit. The Morses find that the old homestead in York seems deserted in these recent years, although the children come to visit their parents whenever possible. The 7th of June was their 45th wedding anniversary, which this year they had to observe all alone, a marked contrast to the celebration of their 40th anniversary, when all of their children were present except Ardelle. On June 26, Lou commenced his 51st year of continuous service with the York Corporation.

Our classmate, Leonard G. Ewell, passed away on February 4. He was a graduate of Thayer Academy of Braintree in the Class of 1891, served as principal of the Pembroke, Mass., high school from 1899 to 1908, when he moved to Somerville, Mass., and entered the employ of the Old Colony Trust Company in Boston, which connection continued until his retirement in April, 1944. He was born in Marshfield, Mass., on February 6, 1873, the son of Judson Ewell and Maria (Leonard) Ewell. His mother died in 1881, and his father married again in 1883. There were three children by the first marriage. Leonard, the oldest, his brother Ralph, now deceased, and his sister, Mrs. Emeline Houghton of 2 Marlborough Street, Boston. There were also three children by his father's second marriage: Mrs. Marion Dresser of Marshfield Hills, Mass., Mrs. Edna Phillips of Marshfield Hills, and Gilbert Ewell, a veteran of World War I, who was gassed in battle, returned home in 1918, and died in Marshfield Hills in 1919. Leonard Ewell married Maud E. Livermore of Marshfield Hills in 1895, and their only descendant was Raymond L. L. Ewell, an employee of the Boston Edison Company in the engineering department. They were divorced in 1916, and

Leonard married Nina E. Billings of Salem, Mass., in 1921. She died on February 24, 1943, in Salem, but Leonard continued to reside in their home until his death.

John L. Wagner died on July 1. He was a special student with our Class in electrical engineering for one year. He was born in Wheeling, West Va., on February 22, 1872, and had also attended Cornell University. For years he maintained an office in the State Tower Building in Syracuse. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1898

The Springfield, Mass., *News*, in a column describing an open house at the Forest Park junior high school at which the principal, Burton A. Adams, spoke on "Post-war Military Training," tells us quite a bit about our classmate, as follows: "Colonel Burton A. Adams, a graduate of Essex High school and . . . Technology, entered the local school system as teacher in the Old Mechanics Arts High school which later became Technical High school. Besides his regular duties as director of shops, he was named purchasing agent of Technical High school in 1912, holding that position until 1926. Colonel Adams served with the Old Second Massachusetts regiment, holding the rank of lieutenant. He saw action on the Mexican Border in 1916. He went to France with the American Expeditionary Forces in 1917, serving in grades from captain to major in the Intelligence section First 104th Infantry regiment and later at general staff headquarters. After the armistice he returned to his duties in the local schools. In September, 1919, he was named supervisor of manual training in junior high schools, in addition to his duties at Tech[nical High] and in September, 1931 was given supervision of manual arts in all schools, continuing in this assignment until he was appointed principal of Tech[nical High] in September 1934. In 1940 he was appointed supervisor of School Federal Government projects. At present he is commanding officer of the 22nd Regiment, Massachusetts State Guard."

In the July issue we reported from newspaper clippings Charley Winslow's retirement from the department of public health at Yale. A few days later we had a letter from Charley himself, commenting as follows: "It might perhaps be of interest to note that I am being retired . . . at the age of 68. I am happy to report that the department which I have organized and headed for 30 years will be carried forward along broad lines, and that my associate, Professor Ira V. Hiscock, has been appointed its head. I shall continue to live in New Haven and to go on with my work as director of the John B. Pierce Laboratory of Hygiene (which is an extra-university activity). I shall also continue to edit the *American Journal of Public Health*."

We feel deep sympathy with Paul Johnson for the loss of his grandson, Paul Seymour Johnson, who was a V-12 student, and was soon to receive his ensign's commission. Young Paul and a fellow student were sailing in San Francisco Bay. The rudder became unshipped, and the boys went overboard to recover it, but the boat drifted away so rapidly they could not get

back to it. They took refuge on a small buoy; but after clinging to it for three hours, young Paul volunteered, at eight in the evening, to swim ashore for help. In the water he was hit on the head by a log and drowned. His companion survived the night clinging to the buoy. Losses in training are just as inevitable as in actual combat, and young Paul's heroism in venturing the swim to save his comrade was equal to heroism in battle.

We have word of the death of Horace A. Kelley, Jr., in January of 1941. His last address was 1051 East 6th Street, San Bernadino, Calif.

We note the following new addresses: John H. Larrabee, I, 92 Porter Street, Melrose, Mass.; Howard Snelling, I, Pittsboro, N.C.; and Professor Charles-Edward A. Winslow, 313 St. Ronan Street, New Haven, Conn. — ARTHUR A. BLANCHARD, *Secretary*, Room 6-421, M.I.T., Cambridge 39, Mass.

1899

Ethel Fay and Thomas P. Robinson are the authors of a book entitled *Your Own House*. It is attractively and generously illustrated with pencil sketches of houses and architectural details. It will pay you to look it up. Tommy has retired from active practice and is employing his time writing. His home is in Hingham, Mass.

Frank F. Fowle, consulting engineer, Chicago, was awarded the Octave Chanute medal by the Chicago Engineers Club for the best paper on mechanical engineering presented to the club during 1942. The subject of this paper was the "100th Anniversary of the First Iron Steamboat on the Great Lakes." Frank won this medal in 1936 also for the best paper on electrical engineering, the title of which was "The Nation's Power Supply: Its Economic Development Under Private Enterprise." Frank's two sons are now lieutenants in the Navy.

Herbert M. Case died late in March, 1941, but the facts concerning his career have only recently been obtained. After graduation Herbert's first work was with the General Electric Company. In 1912 he went with the Ellis L. Phillip Company, and as chief engineer took an active part in the development of the system of Long Island Lighting Company operating in Nassau and Suffolk counties on Long Island. In 1940 he was made engineering consultant.

Mrs. Case survives her husband, as do their two children, Norton M. Case of Lenox, Mass., and Mrs. Sidney F. Lush of Amityville. Norton is a graduate of the M.I.T. Class of 1928 and later received a master's degree. Following somewhat in his father's footsteps, he is now with the General Electric Company in Pittsfield, Mass.

The following notice appeared in the Brookline, Mass., *Chronicle* for June 7: "Dwight Farnum, a former resident of Brookline for many years, died suddenly in Temple City, California, June 5, in his seventy-first year. A graduate of Brookline High in 1895 and of . . . Technology in 1899, Mr. Farnum had been a successful mining engineer in the West for the past forty years. He leaves a widow, also two sisters, Mrs. Clifford Tylor and Miss Bertha Farnum of Brookline."

Miles Standish Richmond, architect and engineer, is located at 201 Devonshire Street, Boston, and is specializing in the restoration of old colonial houses throughout New England. Apparently, this is as much of a hobby as a professional enterprise with him, for he seems to be getting a great kick out of seeing old houses restored in an authentic manner and later furnished in keeping with the period in which they were built. I shall be tempted to buy an old house and turn it over to him if I later return to old New England. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

1900

George Russell turns in the following account of the class reunion: "June 21, 22, and 23 are memorable dates for those who made the pilgrimage to East Bay Lodge, Osterville, on old Cape Cod, to join in celebrating our 45th year since graduation; and some celebration it turned out to be. Early in the week came Ted and Mrs. Brigham from Greenport, L.I., where for years Ted has been managing the affairs of the Greenport Basin and Construction Company. Walter and Mrs. Kattelle showed up on Tuesday, having driven up from Montclair, N.J. Wednesday brought Dick and Mrs. Wastcoat and daughter, Burt and Mrs. Cotting, Harry Osgood and Miss Heffman from Virginia, George Atwood, Bob Blair, Charlie and Mrs. Smith. The evening train brought Paul and Mrs. Price, Dick DeWolf from Washington, and Mort Silverman. Louis Crowell came over from East Dennis, and later in the evening Fred Lawley and Charlie Leary drove in from Kingston with their wives. Thursday officially opened the celebration and brought Stan Fitch with his daughter, Mrs. Godly and granddaughter, Bill Hart from Montreal, Jim and Mrs. Patch, Chester and Mrs. Richardson and daughter, George and Mrs. Russell, Herbert and Mrs. Stearns, Ed and Mrs. Brigham, Arthur and Mrs. Walworth, Gibbs, Percy Ziegler, Franklin Conant, Ingalls, and Mrs. Crowell with her two daughters. Safe in their car, having outfoxed the state motor vehicle inspector, appeared Herb Howe, his brother Bill, and their friend Mr. Gately. Elbert Allen flew in from Washington on Friday, swelling the attendance to a total of 52.

"A special feature of all previous reunions has been the greeting of old friends whose faces appear for the first time since sheepskins were distributed. This year was no exception. DeWolf, Gibbs, Ted Brigham, and Harry Osgood were welcomed with open arms and added greatly to the spirit of the occasion.

"Thursday evening saw everyone assembled in the comfortable lounge of the Lodge. Patch had brought with him his movie films taken at previous reunions, and these were run off, much to the delight of those who had attended. He also showed a reel in colors depicting the process of raising, harvesting, and marketing digitalis, a remunerative hobby in which he has indulged for several years.

"Russell next read accounts of the reunions held in 1925 and 1940. Then followed a short business meeting devoted to the matter of preparing for the reunion in 1950. It was voted that the committee of

five who had arranged the current affair be empowered to appoint a committee of 15 to arrange for this golden anniversary. It has become a Technology custom to give special recognition during graduation week to the 50-year Class. Representatives of the class attend the graduation exercises and are given seats on the platform. A luncheon in their honor is given by President Compton. One of the class is chosen to deliver an address to the graduating class on Class Day, and last, but not least in importance, it is customary for the 50-year Class to make a present to the Institute. It is to be the duty of the above-mentioned committee to prepare for these functions and to make the reunion in 1950 a memorable one. The committee, however, can do only the *planning*; it will be up to every member to make it a great success.

"Business over, several of the men were called upon to add their bit to the fun. George Gibbs was asked to explain how a civil engineer ever made the ascent to the ministry, George not only having held several pastorates but now being a member of the Society of St. John the Evangelist, which has a monastery on Memorial Drive in Cambridge. He gave an interesting account of his work and reviewed his experiences during World War I, when he was in charge of the Technology Bureau of the American University Union in Paris. George may be 45 years older than when we wished him good luck in 1900, but he was the same old George, and his genial personality added much to the enjoyment of the reunion. Wastcoat followed with an account of incidents connected with doing business during war times; Ziegler spoke in a happy vein recalling undergraduate days; and Charlie Smith, Vice-president of the New Haven Railroad, kept interest high with a brief recital of the work done by his road in the present war. Although the evening was then well advanced, no one wanted to bring the day to a close, and until the morning hours commenced their round of the clock the company sat down to a game of beano in which the stakes were war bonds (or perhaps stamps) furnished from a somewhat depleted treasury.

"Throughout the reunion the weatherman was very indulgent, and Friday was a perfect day in all respects. The ball games and swims that heightened the fun in 1925 seemed a little too strenuous for repetition, but it was no wheel-chair brigade that ensconced itself beneath the trees and indulged in tall stories and reminiscences. Some of the more hardy souls did attempt to renew their acquaintance with golf and came back to lunch none the worse for the experience, although Charlie Smith was heard to mutter, as he crept up the porch steps, 'You can't fool old Father Time.' We all missed Joe Draper, who had been detained in Boston by reason of an emergency hospital appointment. Cotting wrote him a cheery note which was signed by all. At present writing we are happy to say that Joe is out of the hospital, out of the woods, and enjoyed the letter.

"Friday afternoon Patch photographed the group, and Mrs. Walworth presented each of the ladies with an exquisite pin or brooch made by herself from small sea shells delicately colored. The reunion in 1930 was held at the Oyster Harbors Club, and Cotting arranged a dinner on Friday

night at this celebrated resort, which was near the Lodge. Saturday morning came all too soon, and reluctantly the goodbyes which must suffice for another five years were said. It had been a grand time, and as we left for home all minds were hopefully set on 1950. Saturday evening saw 16 of the Class at the annual Alumni Dinner at the Hotel Statler. Present were Allen, Ted Brigham, Comey, Conant, Corting, Fitch, Jackson, Kattelle, Neall, Osgood, Price, Russell, Silverman, Charlie Smith, Wastcoat, and Ziegler."

A part of Harry Grant's letter follows: "I am grateful to you for sending me the splendid report on the 45th class reunion. The picture is excellent, and it gave me a thrill to pick out old friends, ably aided by your key. I was exceedingly sorry to have to miss this reunion but am counting on coming to the 50th 'irregardless.' You should not have to struggle with a depleted treasury. The generous attention you give to Institute and class matters should be well supported by all of us loafers. I feel guilty about writing this letter without giving you a whiff of news. Unfortunately, I have no news excepting that Providence continues to be kind to us, and we are well and happy. We are staunch believers in the theory that the way to keep well is to keep busy. One of Washington's leading citizens passed his 102d birthday recently and was at his office as usual. He was the founder and proprietor of the large Heurich breweries. When asked by reporters how to live to a ripe old age, his reply was, 'Be temperate in all things and drink Heurich beer.'

"My son, Charles S. Grant, a captain, is now beginning his fifth year in the Army Air Forces. He was in action early, as his bombardment group (the 22d) was the first bombardment group to reach Australia after Pearl Harbor. They had plenty of action over Gona, Lae, Salamaua, the Bismarck Sea, and Coral Sea. Fortunately, he came back unharmed and is in the pink of condition. Marcy Sperry is away from Washington on a short vacation. He is at the Mooring in Manset, Maine. If Marcy's father, Admiral Charles Sperry, who took the American battle fleet around the world in the early days of Theodore Roosevelt's administration, were living, he would be proud of Marcy's children. They are all grown now. His daughter Edith is in Stockholm with the Office of strategic Services. His daughter Ann is in Calcutta, India, under same auspices. His daughter Margaret is in Washington, but spends every day at the Children's Hospital. His son, William H. Sperry, a lieutenant in the Coast Artillery, is in the Philippines. His oldest son, Marcy, Jr., is with Stone and Webster in Boston."

We are now to hear from Bill Clarke — read carefully: "Regretting my inability to be with you, I write to offer my felicitations to the Class. If you recall a little runt who was ever seeking someone to do his math, that was yours truly. The only thing I did at the Institute was to run 100 yards in 7¾ seconds, the night Dewey came to Boston and the police charged. You are mistaken in thinking I built Boulder Dam and the Panama Canal. I started in southern Rhode Island, and circumstances saw to it I remained there. My first job, at a desk, called for 91 hours a week, for which I received \$15 plus a five-cent card from the

boss at Christmas. I guess the hours were too long for health, for at 66 I was forced to put on reading glasses. Soon I married and promptly became the father of triplets. I do not know which subject at M.I.T. led to this, but anyway was greatly elated, until some guy named Dionne came along and spoiled it all. I fussed around in transportation and public utilities for 26 years, starting, of course, by sweeping out the office, and finally arriving at the goal where I could move to adjourn at the directors' meetings. Then I decided to become a broker and was taming bulls and bears for 11 years. I retired in 1940. Outside of business, I don't recall anything of note. I did serve a while as trustee of a college, but the only reason I accepted that job was with the hope of finding Linus Faunce on the faculty and firing him. There is one oddity, however. I have had as close friends several Tech men, but since leaving the Institute have never met a member of the Class of 1900, not one. It would be a pleasure to have a call from you. I promise a cordial welcome, and you can name your own favorite brand. I live on a farm on Route 91 at West Woodstock, Conn."

Cayvan from Grand Rapids sends in the following: "That's a grand idea, of getting that picture around to us old 1900 fellows. I knew Lawley when we were kids growing up (and his cousin Ed too). In fact, the George Lawley Corporation boat yards were a playground for me. Fred and Ed were fine kids! We used to go sailing in any old tub that the workmen would let us take. And the letter is fine, too, Burt. It does tend to hold us together; especially when one can get nowhere on account of labor shortage. My wife and I have a shack up in the woods on a big lake (18 miles long) with a sailboat, and we sneak away once in a while for perhaps three days, the best we can do. However, things may be better by the 50th reunion, and let's help out on all the mailing and other costs-to-be in that five years (enclosure). And by the way, has Percy Ziegler drunk of the Fountain of Youth? Look at that young man yet!"

Jim Batcheller sends in his usual cheery letter, and it reads like this: "Many appreciative thanks for the report of the 1900 class reunion, which I found genuinely interesting and read with envy — that I could not have joined with you all. The group photograph is also much appreciated, and I compliment you all on being, collectively, a handsome bunch! And seemingly, from outward appearance, all are sound: there are remarkably few wearing glasses, and I see none with hearing aids. As for myself, I don't believe I can qualify to trot in this class crowd for recently I have had to bow to increasing deafness and, with considerable relief, have had myself 'wired for sound'!

"After V-J, I went with a clear conscience to Seattle (August 20-24) and had a delightful visit with Bob Leach. As he had some business out on this coast and also a married daughter and some grandchildren to see, he and his wife spent the hottest part of the summer (in New England) out here, where it is always refreshingly cool. He told me he had not been feeling so well at home this spring, but said he was much improved by the time I saw him. I had your letter and group photo with me, and

we reviewed with pleasure our meeting with you all at East Bay Lodge in 1940. We both hope to join you in 1950; but five years at this time of life for all of us is a long time! It is all very well to meet you at the Alumni Dinner or at Commencement Dinner, but those occasions are too brief and confusing as to environment to be satisfactory for comfortable chatting. Now that the war is over and that in another year travel conditions should be reasonably easy, I hope a way may be found for some sort of social gathering of 1900 before 1950! Thanks to you, personally, for all you have done to hold 1900 together, and my cordial regards and best wishes to you, Russell, and all the others I know and knew."

Harry Chalmers writes: "It was certainly kind of you to give me a personal good word in the class reunion report, which I enjoyed reading. I only wish I could have been there. I have been fortunate in my children and grandchildren, but have felt badly that my affairs have been in such state that I have been able to do no more for the Class. I have not been to Boston since 1916."

Professor Locke '96 informs us that Francis C. Lincoln has been transferred by the Bureau of Mines from Platteville, Wis., to Rapid City, S.D., to act as examining engineer for the Black Hills region. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston 9, Mass.

1902

Since the last class notes appeared, we hear that two members of our Class have passed away. John R. Morse died in Cleveland, Ohio, on March 21. Morse was associated with traction companies in various parts of the country ranging from Florida to Michigan, to the Puget Sound area and, in the latter part of his career, in Ohio.

George T. Seabury died on May 25 in New York City. At the time of his death, he was serving as secretary of the American Society of Civil Engineers, a position which he had filled for 20 years but was soon to have given up to assume special duties for the society. Seabury had followed his profession since his graduation from the Institute. He began work in New York with engineering firms engaged in the construction of the Grand Central Terminal, the subway tunnels, and Riverside Drive. From 1906 to 1915, he was an engineer for the New York Board of Water Supply, helping conduct special studies and construct the Catskill aqueduct and Kensico reservoir and dam. From 1915 to 1918, he was division engineer of the Providence Board of Water Supply. In 1918, he joined the Army as a major and was supervising quartermaster for the construction at Fort Devens, Camp Upton, Camp Mills, Camp Merritt, Camp Dix, Camp Lee, and Fort Meade.

At the close of the war he formed the firm of George T. Seabury, Inc., of Providence, R.I., specializing in heavy construction throughout New England. He also served as manager of the Providence Safety Council. He became secretary of the American Society of Civil Engineers in 1925, and served until his death, at which time he was also president of the Engineering Society's Personnel Service, Inc., secretary of the Engineers' Joint Council, and of the Engineers' Council for Professional Development,

and vice-president of the American Engineering Council. He was an honorary member of the Koninklijk Instituut van Ingenieurs, the Engineering Institute of America, the National Engineering Society of Holland and Canada, and the honorary engineering fraternities Tau Beta Pi and Chi Epsilon. He was a member of the Masonic order and of Delta Upsilon. He left his wife, Mrs. Margaret Knight Seabury, and a daughter, Mrs. Medley Ray of New York City.

From the Alumni Secretary comes word that Cates has been nominated for president of the American Institute of Mining and Metallurgical Engineers, which is equivalent to election. The firm of which Cates is president, the Phelps Dodge Copper Products Corporation, was responsible for the success of the gasoline pipe line under the English Channel which played such a vital part in the European theater of war. The line was a novel idea with many complex problems, which in turn required the design of new machinery and involved the construction of an entire new plant at Yonkers, N.Y.

Two members of our Class, who have long been on the faculty of the Institute, Newell C. Page and Jesse J. Eames, were retired in June with the title of professor emeritus. Page had been on the staff since his graduation and Eames since 1910. — Greeley received the honorary degree of doctor of fine arts from Boston University in May in recognition of his outstanding professional work.

A letter from Dan Patch tells of a very pleasant visit with Frank D. Allen in Philadelphia. Allen is still in the coal business with his office in the Real Estate Trust Building and would like to have any '02 man look him up. Patch, as you all know, is class agent for the Alumni Fund and has tried to account for all members of the Class, and as a result has had one letter, that of Mrs. L. Wallace Sweetser (Mabel Wall), which he especially enjoyed. Mrs. Sweetser writes that, having served as class representative of her Wellesley class, she knows how annoying it is to send mail to members who never reply, and adds: "My appreciation of the facilities of Technology offered me in 1901-1902 is great; I am very proud of my connection with the Institute and consider it an honor to be included in the Class of 1902. But as I was teaching at the time, I never knew any of the Class. My resources have not been sufficient adequately to support two classes, and my first love is naturally Wellesley, where I lived for four years. I enclose a check for five dollars so that I may be accounted for." With a class member of that loyalty, it would appear that others should wish to be "accounted for." Our Class has done well in number of contributors, but the total amount is not up to the quota assigned, and all who have not sent in their bit are asked to get in touch with Patch or the Alumni Fund office. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

1905

Forty-two men and their wives, who had either saved their "A" gasoline since last reunion, or had business trips in the vicinity of Old Lyme, Conn., attended our 40th reunion and had what several pronounced

"a grand old chummy time." Present were Mr. and Mrs. Ball, Mr. and Mrs. Barrier, Mr. and Mrs. Danforth, Mr. and Mrs. Lombard, Mr. and Mrs. Landers, Mr. and Mrs. Gage, Mr. and Mrs. Files, Mr. and Mrs. Strickland, Mr. and Mrs. Graesser, Mr. and Mrs. Crowell, Mr. and Mrs. Robbe, Mr. and Mrs. Goldthwait, Arthur Amberg, Sam Shapira, Hub Kenway, Grove Marcy, Harry West, Ben Lindsly, Bill Motter, Al Dickerman, Joe Brown, Henry Buff, Jim Fouhy, Charles Mayer, Lovell Parker, Charlie Smart, Bob McLean, Ros Davis, Harry Charlesworth, and Willard Simpson.

Several of the fellows had not attended a reunion since graduation — Joe Brown, Lovell Parker, Willard Simpson, and Art Amberg, for instance — and the attempt to identify them was interesting. Simpson, all the way from Texas, arrived late Saturday afternoon, and the hotel proprietor pointed out a group of '05 men chatting out on the lawn. "Not those old men," said Willard. As he approached the group, several said, "Who's that old fellow? Can't be an '05 man." All of which proves that while time flies on, the '05 spirit keeps one young. Simpson won the long distance medal, with Joe Brown from way out Chicago way a close second.

This was a reunion of "fat-chewing." Throughout the two days little groups would gather for reminiscence; then the scene would change, and you'd be talking with another group about college days, or repeating, "Have you heard from so-and-so lately?" Golf was out, as the only course was miles away. Much golf was talked, however, and Parker was conceded the verbal championship for 1945 by virtue of his low scores in playing with most of the senators and other Washington celebrities. Some of our previous golf champs are eager for the next reunion under normal conditions so as to get Parker out on the links for an actual round. The only promise they could get from Parker was that he attended reunions every 40 years.

As to program, about half the gang arrived for dinner Friday night with the balance drifting in during the next 24 hours. Saturday was spent in wandering around, even croquet and archery seeming either too strenuous or less interesting than chatting. Camera men were everywhere. The photography committee — Robbe, Graesser, and Buff — were on the job all the time, frequently assisted by Barrier, Simpson, and Mrs. Ball. Graesser seemed the most scientific of the lot. His ample pockets were filled with range finders, slide rules, light recorders, a computing machine, engineer's tables, and other gadgets. As a result of their maneuvers, however, Chairman Louis has selected a group of prints, which are purchasable at \$2.00 per set. (You have probably already received notice of this.)

The Saturday night gathering around the fireplace in the dormitory ran true to form except that, because of the type of audience, Bill Ball decided to keep a bunch of choice stories he had been saving for four years until the next reunion. Bill and his committee on hydraulics functioned perfectly, however, and added zest (and zip) to the occasion. The Secretary read a cablegram from Axel Hammarberg, III, Stockholm, Sweden, regretting his inability to attend

and sending greetings to all he knew. A telegram from Pete Harvey, Chicago, told of an unexpected emergency assignment keeping him from attending. At the close of the business session, Ed Barrier approached the dais with an air of deep mystery and in his most austere manner called Mr. and Mrs. Secretary before him. In a well-prepared speech, he presented "Ruth and Fred" with a \$100 war bond and Ruth, because of her invaluable help to the Secretary in caring for reunion details, with a beautiful corsage of garden flowers in which the artistic hands of Mrs. Barrier and Mrs. Danforth were evident (we suspect). We deeply appreciate both the intrinsic and sentimental tokens, but as the Secretary has often said, the many evidences of friendship and confidence have been ample reward for the time and effort expended in keeping '05 spirit "tops."

Prince Crowell then put on a floor show — enough said. Ask Mrs. Ball about Prince's "bundling game." She didn't sit down for the rest of the evening. And then your Secretary was inveigled into a "smutty" game. After being lined up with four conspirators and a few fancy passes with a "ziggity zag zig, almagoozium," and so forth, I was sent to look into a mirror and found myself lacking only red lips to start a minstrel show. After taps, some of the unfillables, including Shapira, Amberg, and the Balls, went over to Saybrook for a midnight bite. Sam hasn't been able to figure out yet how a ham sandwich cost him \$6.00. Don't mention it to Sam.

Highlights? Everything was highlights . . . Harry West, who hadn't been with us for 25 years, telling of all kinds of experiences in his wanderings from Timbuctoo to Laconia, N.H., where he is settled in the roofing business . . . Simpson's stories of Texas politics and engineering feats, brilliantly told . . . Amberg, not the string bean of 1904, but actually a well-rounded specimen . . . Crowell, a youthful marvel, full of vigor and ideas . . . Clarence Gage, up from Florida, improved in health, likewise Charlesworth . . . Buff, still class bachelor, with a full complement of photography gadgets . . . The ladies, all 12 of them, mighty good fellows. All in all it was a mighty good reunion with much credit due to the general committee — Ball, Barrier, and Shapira.

Present at the '05 table on Alumni Day, June 23, were Carhart (with guest Perry), Babcock, Chesterman, McLean, Pete Harvey, and myself. At a warm-up in Pete's room prior to the dinner, Andy Fisher joined heartily. Ellis '08 brought greeting from Arthur Gerry, II, whom he had recently seen in Laconia, N.H.

Lack of space in a very busy issue makes it necessary to withhold several interesting bits of news until the next issue, but we do have the sad duty of chronicling the deaths of Mitchell Mackie on June 21, James H. Tebbets on June 12, Arthur T. Hooven on July 8, and Max Cline on July 26. Further details will follow in the December issue. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 71 Newbury Street, Boston 16, Mass.

1906

As four months have elapsed since the last class notes appeared, we will include a

few items which arrived in the spring too late for the June Review.

On June 15, Harold Coes advised the Secretary of the death of Charlie Howard, who on that date passed away at his apartment in the Broadmoor Hotel, Washington, D.C. The following notice of his passing appeared in the *Washington Star* of June 16: "Charles A. Howard, technical director of the Inter-American Development Commission, died . . . at his apartment in the Broadmoor Hotel after a long illness. Mr. Howard had headed the engineering section of the commission, a pan-American body organized to study and develop Latin American business and industry, for two years. During this period he headed an industrial mission to Haiti sponsored by the late President Roosevelt. Before joining the commission, he had conducted similar surveys in Latin America for Ford, Bacon & Davis, New York engineering consultants, and for various Latin American industrial concerns. Mr. Howard was a native of Portland, Me., and a graduate of . . . Technology. Among the engineering positions he held since 1906 were those of assistant to the chief engineer, Consolidated Edison Co.; chief engineer and vice president of Gunn, Richards & Co., New York consulting engineers; chief engineer of A. B. Leach & Co., and of P. W. Chapman & Co., public utility and industrial operators, and treasurer and assistant to the president of United States Lines. He is survived by his widow, Mrs. Caroline K. Howard, Washington; a daughter, Mrs. Thomas H. Hefferan, Chevy Chase, Md., and Grand Rapids, Mich., and two sisters, Mrs. Leon Allen, Tallman, N.Y., and Mrs. R. J. Possiel, Suffern, N.Y." In a letter which Harold Coes sent the Secretary on June 13, advising of Howard's illness, Harold added a postscript to the effect that he had been elected president of the Montclair, N.J., Society of Engineers.

Another of our Class, Carroll A. Farwell, I, who is a member of the firm Fay, Spofford and Thorndike in Boston, is now serving as president of the Boston Society of Civil Engineers. — Carl J. Trauerman '07, who is a mining engineer at Butte, Mont., thoughtfully sent your Secretary a clipping from the *Montana Standard* of June 10. This was of interest to our Class as it recorded the election of Earl Bardwell, III, of Great Falls as grand commander of the Grand Commandery of the Knights Templars of Montana.

The Secretary had the best intentions of attending the Alumni Banquet on Saturday, June 23, but was prevented by illness. It is understood that the Class was represented on this occasion by Sherman Chase, Ralph Clarke, T. L. Hinckley, Ned Rowe, and A. B. Sherman.

A report has been received from H. P. Kane on the status of the 1945-1946 Alumni Fund. As of August 31, our Class showed 96 contributors which was 77 per cent of its quota of 124, the total of the contributions amounting to \$1,663 or 58 per cent of the quota of \$2,850. Last year, 114 contributors gave a total amount of \$2,097 which was 74 per cent of our quota of \$2,850. It is hoped that those who contributed in previous years but have not yet given in this will send in their contribution at an early date. Furthermore, it would be very grati-

fying if many who have not contributed previously would give something this year, thereby improving our class record in respect to the Alumni Fund.

Your Secretary took one week of vacation in September at West Yarmouth on Cape Cod. While there, he looked up our classmate Andrew Kerr, who resides in Barnstable. Andy was very busy gathering cranberries, as it was right in the height of the picking season. He has about 40 acres of bogs in different stages of development and is fast becoming quite a cranberry grower. The Secretary visited one of the bogs and had a chance to see how some of Andy's engineering training was put to good use in the construction of a dam to flood the bog, which is a very necessary part of the growing process. Kerr said that he had received a visit from C. E. Tucker, V, who was on his way down the Cape to look up a building lot. Also, Ralph Patch spent the entire summer on the Cape, recuperating after his important and strenuous war work in Washington. The Secretary made an unsuccessful attempt to contact Ralph. Kerr had been in touch with him by telephone and expected to have him visit one of his cranberry growing sites.

Notices have been received from the Alumni Office of the death of two other classmates: namely, C. M. Soule, VI, who passed away on June 28, and William C. Turner, II, who died on August 18, 1943. The last address available for Soule was 5306 Tilbury Way, Baltimore, Md.; while the last address for Turner, which was received in 1940, listed him as located in New Mexico. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver Street, Boston 10, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

1907

My first letter prepared in my role of Class Agent for the Alumni Fund and mailed to all class members early in August resulted, up to the time of preparing these notes (September 22), in nine contributions totaling \$255 so that as of this date, for the Fund of 1945-1946, we have 105 contributors out of a quota of 115, and \$2,746 with a quota of \$2,650. There were still 28 men who had given in previous years who had not been heard from this year, and to them and all other noncontributors another letter was sent in mid-October. My August letter also brought to me some very welcome letters from classmates, and these form the basis for part of the news that follows in these notes. So, all in all, the letter was reasonably successful in enriching the treasury of the Institute and the treasury of information on which to draw for items in this column.

Our distinguished classmate, Clarence Howe, Minister of Munitions and Supply for Canada, was further honored when this year at the annual commencement of Harvard University he was awarded the honorary degree of doctor of laws. The citation accompanying the award was: "A gifted son of New England, a loyal and effective citizen of Canada, an engineer who hurled munitions against Hitler long before we fired a shot." I wrote a note of congratulations to Clarence on behalf of our Class, and under date of July 6 received

from him the following reply: "It was very kind of you to take the time to write me on this occasion. I need not tell you that I regard this as a very great honor, both for myself and for the members of our Class."

— While we are on the subject of matters collegiate, we are happy to record here the fact, learned through a memorandum kindly sent me last May, too late for the July notes, by Ralph Hudson '07, and also through a clipping from the Rochester, N.Y., *Times-Union*, that on May 12 M. Herbert Eisenhart was elected chairman of the board of trustees of the University of Rochester, of which board he has been a member for 19 years. Herbert is president and general manager of Bausch and Lomb Optical Company, and also a trustee of the Rochester Chamber of Commerce, Eastman Dental Dispensary, Rochester Savings Bank, and a director in the Rochester Institute of Technology, the Security Trust Company, Rochester Gas and Electric Corporation, Rochester Telephone Corporation, and Taylor Instrument Companies. He also has been actively associated with the American Red Cross, the Boy Scouts of America, Hillside Children's Center, the Community Chest, and the Rochester Museum Association. Formerly chairman of the research committee of the National Association of Manufacturers, he is now vice-president of the New York region of the committee for economic development.

Through a warmly cordial and friendly letter received on September 19 from Mrs. Bessie C. Rambo, Avenida Beira Mar 406, Apt. 907, Rio de Janeiro, Brazil, I learned of the death of her husband, our classmate, Marcellus Rambo, on February 10. He became a member of our Class in the fall of 1904, coming to Technology with a degree of B.S. from the University of Georgia. After being graduated with us in Mechanical Engineering, he worked for a year with the American Locomotive Company, a year with Glover Machine Works in Mariette, Ga., and two years with the Maxwell automobile people, and then went to Northwestern University Dental School, receiving a D.D.S. degree in 1913. He then went to Rio de Janeiro, and has practiced dentistry there ever since, also being the representative of Sonotone Corporation of New York (appliances for defective hearing). He did important research work in the relation between contracted dental arches and physical and mental arrested development, the relation between leprosy and dental caries, and the cause and correction of dental caries. He was married in 1918, but there were no children. Mrs. Rambo wrote: "He had suffered from somewhat high blood pressure for some time. . . . On the last day of January he suffered severe pain in his chest . . . a cardiograph showed an artery lesion . . . on the morning of February 10 the end came suddenly. He was buried here in this city . . ." Of course I have written a letter of sympathy on behalf of the Class.

John B. Harlow, a member of our Class, but not a graduate, in Course VI, died of a heart attack on May 16 at his home, 10 Crestmont Road, Montclair, N.J. He was connected with Western Electric Company, 195 Broadway, New York, whose employ he entered in 1910, becoming eventually telephone sales engineer and then commercial engineer. In 1927 he joined the engi-

neering force of Electrical Research Products, Inc., as development manager and in 1936 became contract license manager, a position he retained when that concern became a division of Western Electric in 1942.

It was fine to receive on August 16, a nice letter from Alfred Austin Brooks, II, who is thermodynamic engineer with Moore Steam Turbine division of Worthington Pump and Machinery Corporation at Wells-ville, N.Y. From his message I quote: "I left Technology in the summer of 1906, kicked around doing this, that, and the other, mostly reinforced concrete construction, until the spring of 1910. I went to work in the turbine research of the General Electric Company at Lynn, Mass., then returned to M.I.T. and got my degree in 1913. I remained with General Electric until 1922 then came to Wellsville to take charge of steam parts design and development for the Kerr Steam Turbine Corporation, since sold to Elliott. In 1926 I went to the Moore Steam Turbine Corporation to do similar work. . . . I was married in 1917 and have two married children and one granddaughter. My son, Alfred Austin, Jr., Hobart College 1943, has recently done some pretty nice work in connection with the development of the atomic bomb, and I am all puffed up with pride about it. My wife and I are in average good health. Her hobby is gardening, and I have two — small bore rifle shooting and model sailing yacht design."

Under date of August 10, Bill Coffin, who is senior member of Sturgis Associates, Inc., architects, 120 Boylston Street, Boston, wrote me: "Your recent circular letter as class agent reminded me that as class secretary you might like to receive a line or two from me covering the past few years, so here goes! Since June, 1943, and up to two months ago, I was working as an architect in the engineering department of the National Fireworks, Inc., at West Hanover, Mass., but kept my own office in Boston open to take care of occasional private work. One other architect and I handled the new buildings and alterations for the various munitions plants of the company. It was an interesting change, but I am glad to be back once more in private practice with plenty of work in sight. . . . I have one daughter teaching school, one who has been an entertainer in army camps, service hospitals, and aboard navy ships, and another who is a junior grade lieutenant in the Waves now stationed at San Pedro, Calif."

On August 26, Stanley Wires thoughtfully wrote me saying that he had just received a letter from Stuart Godfrey's wife to the effect that Stuart had been through a very serious operation at Bushnell General Hospital in Brigham, Utah. I at once wrote to Stuart, offering sympathy and hopes of his quick recovery. Under date of September 9, I received a letter from Stuart from Brigham, as follows: "Thanks for your letter. I had been meaning to report to you on this. I left the China-Burma-India theater in June (Stuart is a brigadier general in the Army Air Forces, you all probably recall) and in July assumed command of Geiger Field, Washington (near Spokane), and its training activities for 10,000 aviation engineers. For the past 20 years I had not been on 'sick report,' but

the medicos caught up with me when they found the need for a serious operation, and I have been 'sweating it out' here all summer. Tomorrow we leave to drive north to Spokane, and after a few weeks of convalescent leave I expect to resume command of Geiger Field, a most attractive section. Pearce, our younger son, was graduated from Wilson High in Washington in June (outstanding in athletics, not scholarship) and was inducted into the Army. He is getting his basic training with the doughboys at Camp Blanding, Florida. I am happy, of course, that the combat phase of the war is over, and that your sons have all come through in fine shape."*

As to my sons all three of them have been and still are in the armed forces. Our oldest, nearly 35, drove a tank in Patton's Third Army through Germany and into Austria, and is now in Germany with the army of occupation, eagerly awaiting the time when he will get back to Quincy, Mass., to see his wife and 11-year-old daughter. Another son, nearly 29, a lieutenant (bombardier) in the Army Air Forces, did not reach Europe until last spring, but flew 10 bombing missions over Germany and several over Holland dropping food. He returned to the United States on July 11 with 30 days' furlough, was married on July 28, and left on August 11 for Sioux Falls, S.D., to train for B-29's, but the end of the war changed his program, and as I write this, he is in Harvard, Neb., at a former training base, doing not much of anything, awaiting orders. Our youngest son, 26, served in France in the transportation division of the Army and is now in England hoping to return soon to his wife and two-year-old son in Auburn-dale, Mass. The boys have escaped both injuries and illnesses of any kind.

Returning to Stanley Wires and his letter above referred to, I will quote from it: "Now that I am writing, I had better tell you a bit about myself and family. My oldest son, John, 23, left college and went to Africa with the American Field Service. He was with the English Army in Syria and the French Army at Algiers. After about a year he returned to this country and eventually returned to Europe with the 100th Infantry Division. This outfit fought near Strasbourg, and after several narrow escapes John was wounded in the hip with shrapnel. Since then he has been largely in hospitals, was flown home by way of Iceland, and soon goes to the hospital at Camp Edwards. My younger boy, Bill, 18, is at Camp Crowder, Missouri. He, being the baby, is 6 feet 6¼ inches tall! My daughter Cynthia is one of the assistants to the Red Cross director at Fort Dix, N.J. One son-in-law was 11 months in the Pacific on the carrier *Enterprise*, noted for exploits. My other son-in-law has been superintendent at the Hingham, Mass., yard of Bethlehem Steel Company. . . . As for business, Paul Cummings '07, who has been associated with me for years, has left me and has a fine position with the John Hancock Mutual Life Insurance Company in connection with the new addition that they are going to build to their home office in Boston. He will act as a go-between for the company building committee and the architect and all trades. I am going to carry on alone, handling ma-

* See page V for General Godfrey's death.

terials only, no more labor." (Stanley's business is tiling of all kinds.) "One more thing that may interest you. I have a hobby of collecting decorated tiles from all over the world. I have good examples from Persia, Turkey, Holland, France, Spain, and so on, and many from England; also many early tiles made in the United States in Chelsea, Mass. Professor Norton '18 of Technology has quite a few good examples in one of the cases in the main corridor at the Institute. Although I am not a public speaker, I got roped in by the New England Wedgewood Club." Stan sent me a clipping from the New York *Sun* of June 1, giving quite an extended account of his talk, but I have not space to quote from it here. I hope that we can arrange for a dinner of '07 men in Boston during this winter, and I have written Stan telling him that I shall ask him to tell us about tiles and exhibit his specimens at that gathering. His business address remains E. Stanley Wires, 202 Southampton Street, Boston.

Two splendid letters came to me during August from Tom Keeling, President of Nashville Machine and Supply Company, 123 Third Avenue, North, Nashville 3, Tenn. One was the result of my class agent letter, and the other the result of my reply to his first one. Out of his three typewritten sheets, I can here give only the highlights, for lack of space in these notes. He is evidently successful in business and, with his wife, enjoys good health. His older son, Tom, Jr. (M.I.T. '35), in the April before Pearl Harbor was called into the service as a reserve first lieutenant and sent to Washington, D.C., where he has been ever since. He is now a lieutenant colonel in the Coast Artillery Corps and chief of Chemical Section, Supply, Army Service Force, — "a pretty long title for a 32-year-old boy," Tom says. He has been responsible for the allocation of chemicals used by the Army and apparently was considered by his superiors to be more valuable as a "brass hat" than in the field. He has a wife and two children, the older being Tom, 3d, and "in all probability a future student for M.I.T." This Tom, Jr., noted the name of Alexander Macomber in the Washington directory of government officials, called him on the telephone and had a nice chat. Our classmate's other son, Henry, 23, is a first lieutenant in the Army Air Forces, a pilot who flew a C-47 in France for about a year, was in 15 combat missions in which he towed gliders and dropped paratroopers. He is now with the army of occupation in Germany.

A welcome letter from Cliff Draper received in August told me that he is now a staff member with Trade Ways, Inc., 285 Madison Avenue, New York City, management consultants, sales analysts, and market researchers. He travels a great deal all over the middle and eastern section of the country, but maintains his home at 1046 Ardsley Road, Schenectady, N.Y. His daughter Doris is married and lives in California. Her husband is a development engineer with Lockheed Aircraft. — A friendly note came to me in August from O. L. Peabody, referring to my letter as class agent. Peabo and his wife had just returned from a vacation at Ogunquit, Maine. He is still working at the George H. Morrill Company plant (printing inks) at Norwood, Mass. — Through a memo-

randum kindly provided by Charles E. Locke '96, as well as by a clipping from the Salt Lake City *Tribune* of May 20, I learned that J. C. Kinnear was elected vice-president in charge of the southwestern division of the Kennecott Copper Corporation, having been general manager of that company's Nevada Mines division since 1928. Jack is chairman of the Nevada Mines Operators Association and chairman of the state mining board. He is also president of the Nevada State Board of Education, vice-president of the Nevada area for the Boy Scouts of America, and actively interested in many civic and fraternal organizations. His home is in McGill, Nev.

Last spring Sam Coupal gave up his job as director of the Arizona State Department of Mineral Resources and established an office for consulting work at Room 307, Home Builders Building, Phoenix, Ariz. — On last August 8 as result of my class agent letter, Mrs. Chester A. Vose from Marion, Mass., wrote me as follows: "Chet has asked that I write you a note to send with his contribution. I am sorry to report that he was taken seriously ill on May 26 and has been under the care of our family physician ever since and also spent a week at Phillips House in Boston for tests and observation. He has been unable to attend to his business affairs (cranberry growing) but shows signs of improvement each day, and the doctor believes that he is on the upgrade. I read to him the Bud Luce letter in *The Review*, and he was much interested. . . ." Of course I wrote to Chet's wife in reply, expressing my concern over this situation. I have heard nothing further. — John Frank sent me a copy of a letter dated August 28, addressed to him as president of Ilg Electric Ventilating Company, stating that the Navy Board for Production Awards had granted his plant a fourth renewal of the Army-Navy "E" Award — Roger D. Gale's home address is now 32 Bishop Road, Wollaston 70, Mass.; Charles M. Hutchins, R.F.D., Duxbury, Mass.; Arthur K. Tylee's, 21 Burton Road, Forest Hill Village, Toronto, Ontario, Canada. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

The Class had a good turnout at the Greater Boston Alumni Banquet on June 23 at the Hotel Statler. The following were present: Toot Ellis, Linc Mayo, Bill McAuliffe, Henry Sewell, Cookie, Ted Joy, and Nick Carter. Harold Gurney couldn't make the dinner as he was officiating at the 45th reunion of the Class of 1900 of the Emerson School in East Boston, of which he is president. He dropped in, however, for the speeches. Silk Daley's son, M.I.T. '35, sat at an adjoining table and was introduced to all the Class. He is a major in Army Ordnance. He promised to try and get Silk to come to some of our class dinners. We were honored by having President Compton at our table for a few minutes, as he is an "ought-eighteen" himself.

The first dinner and meeting of the 1945-1946 season will be held at the University Club, 40 Trinity Place, Boston, on Tuesday, November 13 at 6:00 P.M. We hope to show colored movies and Kodachromes. The

usual notices will be sent out early in November. Make your plans to come and get acquainted.

Hardy Cross was elected a fellow of the American Academy of Arts and Sciences in Boston on May 9. — Mademoiselle Alice Marguerite Waldvogel and Charles Waldo Morrison announce their marriage, which took place on July 28, at the Church of Saint Vincent De Paul, New York City.

We recently learned that J. W. Maxwell, after 25 years of service with the Mexican smelting department of the American Smelting and Refining Company, the last 15 years as assistant general manager, has retired and joined the Metals Reserve Company in Washington as commodity marketing specialist. — Gregory M. Dexter is back in the East and has opened an office at 32 Fenimore Road, Scarsdale, N.Y., specializing as consulting engineer on business management problems. — A letter from Steese reports that after a long period in the hospital he is now out of the Army and living at Mount Holly Springs, Pa. He was naturally disappointed not to receive his well-deserved promotion to the rank of general owing to his illness. We hope he may enjoy good health from now on, and we know he would appreciate letters from any of the boys.

We report with regret the death of Harold McCready of the Union Switch and Signal Company on August 2. — Linc Mayo calls attention to the fact that the class balance is below \$100. Although we haven't sent out dues bills for some time, we believe it would be a good idea if some of the fellows sent in some contributions to improve our finances. — We have the following changes of address to report: J. Worth Maxwell, Metals Reserve Company, Room 812-811 Vermont Avenue, Washington 25, D.C.; Joseph B. Sando, 100 Crawford Avenue, Syracuse 3, N.Y. — H. LESTON CARTER, *Secretary*, 60 Batterymarch, Boston 10, Mass.

1909

With a new Review year now under way, it seems pertinent that your Class President break his many months of silence with some sort of message to the Class. First, I wish to compliment our very diligent, efficient, and energetic Secretary and the Review Secretary, both of whom so tirelessly dig up class notes and bits of interesting anecdotes from every direction. It is really a pity that all members of our Class do not receive *The Review* and thus share in Paul's and Chet's 1909 Class News. But I know that I voice the sentiments and the appreciation of those class members who do receive the issues of *The Review* when I say: Thanks Paul and Chet for the swell job that you are doing.

Another matter that is particularly on my mind is the Alumni Fund, for which I am your class agent. The Fund has been coming along extremely well during these war years and continually improving year by year. Our Class has not been at the bottom of the list in percentage; neither has it been very close to the top. At the present time, for this Fund year of 1945-1946, we have contributed only 65 per cent of our quota, whereas four classes have already gone over the top to exceed their 100 per cent quota mark. Although the Fund has continually increased over each previous

year, it is quite striking to see the regularity of our class contributors. The Alumni Fund furnishes the Class Agent each year with the names of the members of his Class who contribute. Since the contributors all receive The Review, I am taking this opportunity of thanking you collectively for your interest, your generosity, and your continued faithfulness. As soon as your contribution is received, the Alumni Fund office automatically crosses your name off the mailing list so that you will not receive any more "requests" from your Class Agent; therefore you do not participate in some of the information which continues to go out to the noncontributors. I believe you will be interested in some of the facts and figures.

The total number of Contributors for the Fund year of 1940-1941 was 104; for 1941-1942, 102; for 1942-1943, 108; for 1943-1944, 105; and for 1944-1945, 107. Of these totals, 78 classmates have contributed every year, and 15 more slipped only one year out of the five. There are also 15 to 20 members of the Class who some years ago took out life insurance policies payable to M.I.T. as the beneficiary. Several of this group have felt that their annual premium is a direct contribution to the Institute, so do not double up by also giving to the Fund. Unfortunately the Fund is not permitted to give any credit to the Class, or to these policyholders, but I also wish to thank them here and now for their continued generosity in keeping up their annual payments, each of which exceeds the over-all average of Fund contributions. Of course, the fellows who carry insurance policies and also contribute to the Fund are super-duper. From the above figures you will see how consistent our class contributors have been during these five Fund years, but the same figures show also how consistent have been our noncontributing members. What we need is *more* contributors. Don't worry about the amount. The Fund will receive it graciously and accept it with thanks. Please give it your earnest consideration. I send my best personal wishes to all of you from down on the farm. Carl.

From Paul: The dead line for copy for this November Review overtakes me down on Martin's Point at Friendship on the Maine Coast. I've been away from the city since early August and during all the poignant days of the surrender in the Pacific. As I write this, it is almost 26 years to the day since I sailed up Tokyo Bay on the good Dutch freighter *Tjisalak* for my first glimpse of Japan and the coast of Asia. We lay in Yokohama harbor for several days, during which the dozen of us who were passengers all went ashore daily, took our first self-conscious rides in rickshas, and went up to nearby Tokyo for a "look-see." At this distance, I have three vivid recollections of Tokyo. I got completely lost in the street traffic and had a tough time of it trying to find someone who understood English and could direct me to the railroad station and the train back to Yokohama. I bought myself an oiled raincoat that gave me such good service that it was soon known as "my Tokyo raincoat." And then there was that afternoon when I stood on the roadway along the moat that surrounded the Imperial Palace and wondered what it might be like behind those grim

and ancient walls, that date back, as I recall, to the days of the Plymouth Colony in Massachusetts. Today, what I'd like to know is when Admiral Halsey will cross that moat securely mounted on the White Nag, as he has promised us he will do. You'll all know the answer long before you see in print what I am today writing.

Here in this remote spot on the Maine Coast, in the year 1945, it is hard, now and then, for one like me to sort out his impressions. Newspapers are no necessity up here. You miss your favorite morning paper. You'd like to read your favorite feature, like Major Elliott, or Walter Lippmann, or David Lawrence. But news is pouring from the radio every hour. In this hospitable Dodge home that I have known for almost 25 years, we all sit listening attentively to the radio, from Lowell Thomas at 6:45 almost until Gabriel Heatter at nine o'clock. It is practically a rite. We get news from voices that I, the world's worst radio fan, could hardly have named before I began hearing them every day. My car is in New Jersey. Gas was rationed when I left home, and anyway an A card is not so good when you want to cover about 400 miles. But newspapers have to be bought in the village of Friendship, two long, trudging miles each way for one with no car. In a sense, you throw away the calendar. I am even asked what day of the week it is! And I try to puzzle it out from my "city" date book. These creaming ten-foot tides mean far more than the day of the week to the lobstermen who are the neighbors. The customary radio programs somehow do not seem to belong. "Information Please," one of my few pets, was on the other night. Of all living persons, Fred Allen was guest star. I could not help thinking, as I enjoyed his wisecracks or was bowled down by the skill of John Kieran and heard an aside from the Food Production Administration, that I was listening to two polar antipodes of something or other. Here was the essence of Broadway and 42d Street with all its superficial jocularly brought into this remote home where the only sound outside was the wind in trees along the shore of Hatchet Cove.

The Review Secretary had made every effort to be present at the Alumni Banquet held at the Statler on Saturday evening, June 23, but an inevitable prior engagement made it necessary for him to be out of town. Johnny Willard, II, however, offered to report for the class notes and states that besides himself, Tom Desmond, I, George Haynes, VII, Francis Loud, VI, Chick Shaw, V, and Henry Spencer, II, sat at the '09 table. Art Shaw, I, one of the class reliables felt obliged to attend the graduation of his son, Robert S., from the Harvard Medical School (see May Review). John Willard, Jr., is a first-class seaman studying radar at the Great Lakes Naval Training Station.

Last June another classmate, Tom Spooner, VI, was honored by a doctor's degree from Bates College, but too late to go in the July Review. Here is the citation, which speaks for itself: "Mr. President — I have the honor to present Thomas Spooner, of the Class of 1905, manager of the Engineering Laboratories and Standards, Westinghouse Electric and Manufacturing Company, Pittsburgh. The College may regard itself as coming of age when it

includes three-generation alumni families. Mr. Spooner's father, Class of 1874, Cobb Divinity School, 1877, was an overseer for nine years. His daughter, Alice, is a member of the Class of 1944. Little did Thomas Spooner, the boy, realize, when he heard the thunder roll around his native New Hampshire hills, that one day he would help discover Vulcan's laboratory, play with his lightning, and measure its voltage. After a short apprenticeship with Stone and Webster, Mr. Spooner came to the research department of Westinghouse in 1909, steadily advancing to his present position. His researches on iron losses and rotating machines provided the foundation for the methods used by the company's designers. His investigations, particularly in the field of electronics, became a vital contribution to the war effort, and promise much for the days of rebuilding. His book, *Properties and Testing of Magnetic Materials*, the standard publication in the field, has made him internationally known. He is an active leader in many professional groups and a frequent contributor to their publications. He has never been too busy to serve his college as a leader in his local alumni group and in its general graduate interests. His achievements make appropriate the award of the degree of Doctor of Science." Congratulations, Tom.

In prior class notes we have called attention to the fact that Johnny Willard was busy commuting north, south, and west in his efficiency and industrial management work. His trips west were in part concerned with converting the logging industry, which had been conducted in a more or less haphazard manner, into a well-planned and co-ordinated business. Some of the results of Johnny's work can now be found in a paper by himself and Don M. Matthews, "Preplanning of Logging Operations for Minimum Costs," appearing in the May number of *Mechanical Engineering*.

George Wallis, our Assistant Secretary in Chicago, came East here to New England but was unable to time his trip so as to meet the Review Secretary or Paul, who was delayed on his way to Maine. He continues thus: "After the sudden termination of gasoline rationing, we were able to tour the countryside and enjoy more frequent contacts with our daughters and their families. Next summer we are looking forward to a lot more fun with our four grandchildren and also to driving through some of the New England country which we have not seen for five years."

G. A. Joslin, III, has become an associate in the newly formed Behre Dolbear and Company, consultants in the mineral industries, mining, metallurgy, and geology, with head office at 11 Broadway, New York City, and western headquarters at Joslin's office, 704 South Spring Street, Los Angeles. This firm is particularly qualified to consider foreign engagements, the members and associates having done work in 20 foreign countries, while one or another of them has served as advisers to several foreign powers.

We regret to announce the death of another classmate, Harold McCready, VI, which occurred on August 2 at his home, 130 South Munn Avenue, East Orange, N.J., at the age of 60. He was born in Milford, Ontario. At 17 he started work as a signal helper on the Pennsylvania Railroad,

at the same time attending Shady Side Academy near Pittsburgh. He entered the services of the Union Switch and Signal Company in 1904 as a circuit draftsman. Some of his first designs were used in the New York subways. He was connected with the company for 41 years, being district manager of the New York offices at the time of his death. He was largely responsible for the installation of much of the switch and signal equipment of railroads of the East. He was also the author of an *Alternating Current Signalling Handbook* and many technical papers on signaling. He is survived by his wife, Mrs. Ethel Freeman McCready; two daughters, Mrs. Norman Russell and Mrs. George Gulick, both of East Orange; two sons, William McCready of East Orange and Colin McCready, an apprentice seaman in the Naval Reserve at the Great Lakes Naval Training Station; and one grandchild. — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1910

The Army was considerate enough, I am happy to state, to accept my request to be returned to civilian life. On July 24, consequently, I doffed my uniform and started in where I left off on September 1, 1942. Although still on terminal leave until October 6, I feel very much relieved to be no longer so directly under Uncle Sam's control.

A short note from Frank Bell says he has been returned from Europe and is now stationed at Fort Belvoir, Virginia. Frank is doing his utmost to be detached from the service, feeling himself to be urgently needed with his contracting firm in Texas. A letter from Joe Northrop of Houston, Texas, who was associated with the architectural work for Ellington Field, expressed his wish to be remembered to all members of the Class.

The following was published in the Mount Kisco, N.Y., *Recorder*: "R. E. Gage, of Armonk, a native of Palmer, Mass., who for 14 years has been director of research and development for Mathieson Alkali Works of New York City, has been appointed technical advisor, and is being succeeded as research director by G. P. Vincent, manager of the sales development and technical service department of the company. Mr. Gage is a graduate of . . . Technology."

It has been some time since we have heard from Bradley Jones. The following, however, from the Philadelphia *Inquirer*, brings him before us again: "Some years ago, Prof. Bradley Jones, head of the Aeronautical Engineering Department of the College of Engineering and Commerce at the University of Cincinnati, worked his way through a New England High School and . . . Technology as a page boy in Boston's Public Library. Now, he learns that the same library has placed one of his books, 'Elements of Practical Aerodynamics' — currently in its third edition — on its recommended list of works giving a background in the field of postwar private and commercial aircraft."

Only five 1910 men attended the Alumni Banquet at the Statler Hotel in Boston last June. They were John Babcock, Cliff Waldo, Charles Wallour, Murray Mellish, and myself. We had a most enjoyable time and all determined to secure a better attendance next year.

I had luncheon with Ralph Horne recently, and he is extremely busy with post-war engineering work. — Ted Whitney, a lieutenant colonel, is now stationed in Paris in charge of utilities.

Now that the war is over and general travel conditions will return to normal, we may be able to have the 35th reunion of the Class next June. Perhaps it will have to be called the 35th plus one, but let us make it a real one. Plenty of time is given herewith for all to make plans to attend. The class standing in the Alumni Fund is not all it should be. Although many have contributed generously, the total number contributing is small compared with that of other classes. Let those of us who have not responded get out the checkbook and show that the members of 1910 take as much interest in Technology as does any other class. — HERBERT S. CLEVERDON, *Secretary*, 117 Grant Avenue, Newton Center 59, Mass.

1911

Surely it was with justified pride that we of 1911, on that fateful day in early September when the Japs signed the peace terms at Tokyo, knew that our own four-star general — George Churchill Kenney — was right up front with General MacArthur during the ceremonies, which were broadcast world-wide. Your President and your Secretary each wrote congratulatory letters to George, in behalf of his classmates, shortly after the mid-August declaration of Japan's surrender. As Don said: "Our pride in you is boundless, George. Good luck and God bless you!" In mid-July George was awarded a second Oak Leaf Cluster for his Distinguished Service Medal in recognition of his work as commander of the Allied Air Forces in the southwest Pacific area from September, 1943. In addition to this medal with two clusters, George also holds the Silver Star, the Distinguished Flying Cross, the Purple Heart, and is an honorary knight commander of the military division of the Order of the British Empire. Small wonder the New York *Sun* said editorially: "Imagination and boldness have always marked General Kenney's employment of air power, and his exploitation of the air bases won near the Japanese home islands can be expected to be distinguished by those same qualities."

Another classmate who won great renown in World War II is Monk de Florez, II, a captain in the Navy, of whom *Time* on July 2 said, in an article headed "De Florez and the Future": "If any man can be said to have sparked the whole training program, it is the Navy's stocky, dynamic Capt. Luis de Florez, Chief of the Special Devices Division (which was incorporated this month with the Navy's Office of Research and Inventions). To help solve the Navy's training problems, De Florez gave up a lucrative (about \$100,000 a year) position as consulting engineer to several oil companies. A blond, exuberant genius, he has invented scores of big and little gadgets (including an electric fly-trap at the age of

11). He originated most of the 1,475 projects completed by his office to date, was rewarded with the Legion of Merit last month. No formal educator, Capt. de Florez is now enthusiastic about the use of his gadgets in peacetime schooling. He believes they 'can be applied to the arts and science as effectively as to the field of commercial competition.' An assistant put it very neatly: 'They make learning fun.'"

Although no details are available, it was with deep regret that I received word of the death of J. Porter Hart, VI, at his home in Burbank, Calif., on June 15. A quiet, industrious, unassuming individual, Hart took his master's degree with us, being with us only in our senior year. For many years he had conducted an office as consulting engineer in Los Angeles, until 1943, when he went with Bendix Aviation Corporation at Burbank. A graduate of Annapolis, he attained the rank of lieutenant commander in World War I. He is survived by two sons, one of them married, and by two granddaughters.

When one opened at the financial page of the Boston *Herald* for September 26, it seemed as if Jack Herlihy, II, were ready to speak to you — so fine was the picture of him accompanying an announcement of the appointment of John A. Herlihy, a native of Lynn, as one of two new company vice-presidents. With Boston Edison Company since 1913, he became assistant superintendent of the supply department, after serving as a captain in the Army Air Forces overseas in World War I. He became superintendent in 1935, an assistant vice-president in 1942, and assistant to the general manager in 1944.

Something slipped this June, and we had but nine men at the Alumni Day Banquet at the Statler. Usually we have at least eleven! Course I, with three entries — F. C. Harrington, Charlie Linehan, and Aleck Yereance — led the field, while Course II had Obie Clark and Jack Herlihy, thus being tied with Course VI, represented by Roger Loud and Dennie, who led the songs and cheers as usual. Art Leary, XI, and Emmons Whitcomb, X, completed the party of nine from 1911.

Our juniors have made the headlines this summer. Orville B. Denison, Jr., a lieutenant in the Naval Reserve, married Virginia Copp at Cornish, Maine, on July 21. One of the bridesmaids was Sallie (Hobson) Herrick, daughter of Charlie Hobson, X, and the bride's roommate at Westbrook Junior College; while her husband, son of the late Bill Herrick, II, was one of the groom's fraternity brothers in Delta Upsilon at Bowdoin, in the Class of 1941. Charlie and his wife were at the wedding. Joining the Naval Air Corps in April, 1941, young Dennie went on active duty immediately after his graduation from Bowdoin that June and has a record of 18 months of overseas duty in the Caribbean and European theaters. Having acquired 49 points by September 1, he was returned to civilian life on September 20 and has rejoined his bride in Cornish, Maine.

At this early fall writing, we learn from Bob Morse, VI, and his wife that their daughter, Jane Elizabeth, is to marry Lloyd Russell Day, a lieutenant in the Marine Corps Reserve, on October 6 in the Calvary Episcopal Church in Summit, N.J. Jane, a fine girl, has attended recent

class reunions. — In early August up here in Gardner, Stan Hartshorn, X, and his wife proudly announced that their daughter, Barbara E., had been promoted from the rank of junior grade lieutenant to that of full lieutenant in the WAVES, making her the highest ranking wave here. At almost the same time Stan and Jule's boy, Stanford H. Hartshorn, Jr., 18, had just completed his boot training and become a first-class seaman assigned to the Eddy radio and electronics program at Great Lakes. He had completed his freshman year at Technology and is a member of Sigma Alpha Epsilon fraternity.

Don Stevens, II, and Lois, were the proud recipients of a letter from the commander of Submarine Squadron Twenty-Six, advising them in late July that their son, Donald Read Stevens, Jr., a junior grade lieutenant in the Naval Reserve, had been presented a letter of commendation with ribbon, which reads: "For distinguishing himself by excellent service as a (Radar) Operator on a vessel during her . . . patrol in the southwest Pacific area, Lt. (j.g.) Stevens' outstanding energy, zeal, and skill in supervising the operation of equipment in his department and maintaining it in excellent condition, despite numerous material failures, greatly assisted in the continued safe navigation of his ship in treacherous enemy waters and in the procurement of vital information concerning enemy movements. His actions contributed considerably to the inflicting of heavy damage on the enemy and to his ship's safe return to port . . . For his conduct throughout he is commended and authorized to wear the Commendation Ribbon."

John A. Proctor, VI, a lieutenant colonel, who has been serving in Washington since 1942, was assigned in June to the Air Technical Service Command at Wright Field, Ohio, in the office of the procurement division's communications subsection, which buys airborne radio equipment for the Army Air Forces and supervises its production. His son, John, Jr., is a first lieutenant in the Army Air Forces, and he has two daughters, whose husbands are Navy officers. — Sam Schmidt, VII, who edits the Jewish paper, *Every Friday*, in Cincinnati, wrote that he now has two grandsons and a granddaughter. He said he was leaving early this summer on a mission to Europe for the Union of Orthodox Rabbis, reminding us that he went to Europe on a similar mission for them in 1940. — A. T. Cushing, I, writes from Kansas City, Mo., where he is with the United States Department of Agriculture, that his son, Don A. Cushing, 20, became a flight officer (second lieutenant) in the Army Air Corps at Enid, Okla., in late June. After flying one or two successful missions as a pilot, he will become a first lieutenant, Cush added.

A fine letter came from Frank Osborn, III, who was still with the Andes Copper Mining Company in Potrerillos, Chile, in July. His oldest son, who entered the Navy on graduation from the Vineland, N.J., high school in June, 1942, has seen much active service. Having received his training at Great Lakes, he was successively in Pacific service in the destroyer *Sands* up to January, 1943; was wounded in the cruiser *Chicago*, when it sank later that month; was in the battleship *North Carolina* up to April, 1943, when he was wounded and sent

home to the San Diego and Philadelphia naval hospitals; was in the cruiser *Tuscaloosa* on Sicily and North Seas patrol, at Cherbourg on Invasion Day, June, 1944, and at Toulon and Marseilles in August, 1944, later going to the Pacific area in the cruiser *Tuscaloosa*, where, since November, 1944, he was present in the actions at Lingoyen Gulf, Iwo Jima, and Okinawa, being now attached to the Third Fleet. His second son had been getting his basic in V-5 and V-12 at Trinity College, Hartford, Conn., since graduation from Vineland High in June, 1944. Last June he was graduated from these courses and went into preflight training. "We have been pretty busy on copper production since the war clouds started hanging over Europe in 1937," Frank concludes. "Since Pearl Harbor, and even before, we have been under practically continuous operation at full capacity. This has been true of the three large copper properties and the two large nitrate-producing properties. Some strategic minerals have been produced in addition, especially manganese in the northern half of the country."

True to his promise, Ban Hill, I, retired on July 1 as president of the Baltimore Transit Company and after a protracted vacation will once again become a consulting engineer there in Baltimore. In the evening *Sun*, on the day before his retirement, appeared this fine tribute to the genius and popularity of Ban: "On a bedside table in the Mount Washington home of Bancroft Hill, retiring president of the Baltimore Transit Company, there is a telephone. Mr. Hill's first act on quitting his job tomorrow will be to silence that phone. That doesn't mean this downright unpretentious man, who talks in the tones of the chief whittler in a country store argument, is laying aside active life to dawdle for the rest of his days. He's too young for that — 58 last April. He will take a vacation — the first he has had for years — and then will offer his services, for pay, to those who want them, as consulting engineer, and he will take up the study of engineering. You see that phone, on which Mr. Hill has spent most of the mild glowering he has been guilty of in the last few years, has been used to get him out of bed on company business at all hours of the night. He's definitely prejudiced in favor of getting an undisturbed night's sleep." In conclusion the article says: "Mr. and Mrs. Hill live in a roomy, comfortable home at Mount Washington. They have no children and both have very simple tastes, rather enjoy living and accomplishing something, seem to get what they want. Mr. Hill doesn't make any pretense of having just finished the labors of Hercules, but there's a tone in his odd voice which suggests he will enjoy silencing the phone that has waked him so often at night."

In the June issue of the *Metals Review*, we find the following: "Seamless steel tubing for the hydro-pneumatic recoil mechanism on field artillery pieces has simplified and speeded up production of guns, according to Peter D. White [II], vice-president and general manager of the Babcock & Wilcox Tube Co. The use of tubes supersedes the old method which involved cold drilling, by hand lathes. Machine time is now 5 seconds — formerly 8 hours!"

Ottillie Cushman, wife of Paul Cushman, VI, writes from Valparaiso, Ind.: "This 1944-1945 year Paul was chairman of the western district of Pottawattomie Council of the Boy Scouts of America, president of the Valparaiso Community Concert Association, president of the Porter County Youth Center, and chairman of the drive for our local church's share in the Synod's Peace Thank Offering. As of January 1, he was also retiring financial secretary of our church here and is on the board of directors of the local Kiwanis Club. He recently took his 32d degree in Masonry, is king of the Masonic chapter here, warder in the Commandery and associate patron in the Eastern Star here. He also served a term on a tri-county Pottawattomie Council recently." He is also an official of the McGill Manufacturing Company there in Valparaiso.

It was nice to learn that two of our contemporaries in the Class of 1909 received honorary degrees at Northeastern University's commencement exercises in June, when Carl Ell, XI, President, conferred a doctor of engineering on Chet Dawes and doctor of science on Brad Dewey. In his charge to the graduating class, Carl quoted the American poet, Stephen Vincent Benet, who said three years ago: "Our earth is but a small star in the great universe, yet of it we can make, if we choose, a planet unweaved by war, untroubled by hunger or fear, and undivided by senseless distinctions of race, color or theory."

"These words of Benet," said Carl, "lay down the pattern by which we should strive to build. The keynote of the task must be truth, honor, and justice. Many structures, commercial relations, social patterns, and whole nations will need to be completely rebuilt. For the technical requirements of that work you have been adequately trained in principles and methods. But you well know that sound workmanship goes beyond technical skill. It demands qualities of the spirit — integrity, respect for individual personality, courage to face the road, and faith in the future. These qualities are at the very heart of your duty as educated men and women. They are what make a nation great and a world fit to endure. Northeastern is proud to have men and women like you bear her name."

As has become my habit (having missed but one since the idea began in the mid-twenties), I attended the 22d freshman camp at the Institute on July 6 and 7, and this year, despite the fact that there were 499 freshmen present, there seemed to be no 1911 descendants in the group. How fine it is to see large classes once again! — My telephone rang one day in late September, and the operator said Boston was calling. Who do you suppose it was? — George Bashford Forristall, II, back in Boston after years and years in Texas. He had written me in midsummer that he was planning to return this fall, as head of the industrial advertising department of the Harry M. Frost advertising agency at 260 Tremont Street, Boston. He and his wife are living at the Myles Standish Hotel for the present, but hope to find a suburban house eventually. It's great to have George back in his native habitat, and how welcome he'll be at this year's annual "Seven Come Eleven" dinner at Walker Memorial, M.I.T., on the evening of November 7! — Ted Van

Tassel, X, a major, also hopes to return to an inactive status soon, he writes from Camp Polk, La., adding that his daughter, Nancy, was thrilled to receive word that her husband, Lieutenant Russell A. Harmon, Jr., piloted the second plane to land at Atsugi airport in the occupation of Japan. Upon his return Ted's temporary address, he says, will be that of his son, Bill, at 14 Parson Street, West Newton, until he relocates.

I surely hope you have looked at the latest standings of the Class in Alumni Fund VI. We continue to meet, and will surely again pass, our assigned quota for contributors, but that percentage for 1911 in the amount quota is lower than it should be. Preliminary plans for our 35th reunion next June are under way, now that the O.D.T. ban on gatherings of 50 or more has been lifted. Watch for details in the near future, and make your plans now to attend. Two address changes to close: Harold M. Davis, I, North Calais, Vt.; and Howard P. Ireland, XI, 10 MacDougall Street, Auburn, N.Y. Remember: our 35th reunion in June.—ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

1912

One more request for contributions to the Alumni Fund — our Class has reached 78 per cent of its quota of contributors. Let's make this 100 per cent, as everyone can spare a five-spot; and to make quota we need only 29 more contributors. In dollars, we have reached 83 per cent of our quota and need \$507 more to make it 100 per cent. Let's do it.

Ellis L. Spray, Vice-president and general manager of the Westinghouse Electric Elevator Company, has announced the creation of two separate divisions to carry on the work of the company, the air conditioning and the elevator divisions. Ross Rathbun '12, formerly manager of air conditioning, has been appointed manager of the expanded air conditioning division, which now includes the Precipitron. Pointing out that the Precipitron, an electronic device which removes 95 per cent of dirt particles from the air, and air conditioning are in increasing demand as a combined unit, Mr. Spray termed the "wedding of these two branches of our business a natural one." Mr. Rathbun was born in Mitchell, S.D., and was graduated from Dakota Wesleyan University. After doing graduate work in electrical engineering at Technology, he became chief engineer of the Madera Company, Ltd., in Chihuahua, Mexico. He joined the Westinghouse Electric and Manufacturing Company as a sales engineer in 1916, and 10 years later transferred to the sales staff of the Westinghouse Electric Elevator Company, where he became general sales manager in 1935. Mr. Rathbun is a member of the Engineers Club of New York, the Engineers Club of Hudson County, N.J., and many civic, cultural, and fraternal organizations.

Erwin H. Schell, Head of the Department of Business and Engineering Administration at the Institute, addressed a meeting of business and industrial executives on March 15 at the Young Men's Christian Association on "What's Ahead for Management

and Labor." The meeting was sponsored by the industrial committee of the Jersey City Y.M.C.A., of which Roy A. Deible is chairman. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown 72, Mass.

1914

The last notes were written shortly after the end of the European conflict, and now happily these are being prepared just a month after the Japanese surrender. As to most people, these events have brought their changes to 1914 men also. Most of these changes have not yet come to the attention of your Secretary, but here are a few.

Fred Karns, a major, has returned to civilian status. Fred was director of the personnel and supply division of the Pittsburgh Sub-District of the Third Service Command. Before the war Fred was associated with his father in the S. T. Karns Transportation Company at Franklin, Pa., but as his father died while Fred was still in the service, he sold the transportation business and is now temporarily in the Washington area as assistant area director of supplies with the American Red Cross. He is stationed at the headquarters of the eastern area at Alexandria, Va.

Henry L. Gardner had moved from Los Angeles to Henderson, Nev., near Las Vegas, as assistant plant engineer for the Rheem Manufacturing Company. The company had been manufacturing rockets for the Navy and shells for the Army. The business folded up when Japan quit, and now Henry is planning on opening a general engineering office at Las Vegas. — Jim Holmes of the firm of Holmes and Narver at Los Angeles took advantage of the decline in work after the Japanese quit, to consolidate his office into a single location at 626 South Spring Street, Los Angeles. Jim's engineering office force has shrunk to a mere 700 after having been one of the largest engineering offices on the West Coast — as it probably still is. — Rear Admiral Tom Richey used the end of the wars as a good excuse to retire. Tom has been on duty with the Joint Chiefs of Staff in Washington. He is now with the Cargocaire Engineering Corporation and is located in New York City, where he expects to meet classmates at any dinners Charlie Fiske may arrange. — Alden Waitt, a brigadier general, after having been through the African campaign and then covering most of the Pacific, was in Europe on V-E Day. He was at Berchtesgaden at the time of the surrender and has many tall tales to tell about that establishment. Your Secretary can testify as to the location of a few of Hitler's former possessions.

The aircraft industry experienced about the most complete shutdown of any industry on V-J Day. Your Secretary flew to the West Coast by army bomber during the V-J holiday and was at Don Douglas' Santa Monica plant the next day when business was supposed to be resumed. Your Secretary had been through Don's plant several times during the war and can assure you that it was a very different sight after V-J Day, but Don has some very healthy postwar plans. Now that the war is over, it is permissible for your Secretary to tell what he has been doing. In addition to work with his own company, which ex-

panded its output sixfold on military activities, he headed the new missiles division of the National Defense Research Committee working under the general direction of Dr. Bush '16. The work covered two major activities, guided bombs and various applications of television. The visits to Don Douglas' plant were in connection with a special bomb which his company was developing under contract for your Secretary's division of N.D.R.C.

Several 1914 men have been appointed to the Institute's Visiting Committees. Norm MacLeod is on the Committee for Mechanical Engineering, Ernest Crocker on that for Chemistry, and your Secretary on that for the Division of Industrial Cooperation. And speaking of Crocker, how many of us read the "Mark Merit" (Schenley Distillers Corporation) ad on flavor? The ad gives Ernest a great boost on the subject of taste and flavor, particularly as pertaining to whiskey. Buck Dorrance can well claim to be the world's soup king, but it took Crocker to make page one in whiskey.

It is with great regret that it is necessary to announce the death on June 3 of Charlie Olesen. Charlie came to the Institute from Salem, Mass., and was graduated in Mechanical Engineering. For many years he had been with the Stanolind Oil and Gas Company, a producing subsidiary of the Standard Oil Company of Indiana. In 1936 he moved to Tulsa, Okla., from the Texas division and was in charge of that division. He was considered one of the best equipment engineers in the oil field. He leaves a wife and three daughters.

Alumni Day was returned to June this year. Because of war restrictions the attendance was largely limited to local Tech men. Fourteen also abandoned its preprandial meeting. In spite of this, nine of us attended the evening dinner. Duff came up from Pittsburgh and presented his son, who was in the V-12 Navy course. Crocker presented his son, a captain in the Army, who had just returned from overseas service. Also present were Atwood, Gazarian, Hamilton, Petts, Scannell, Tallman, and your Secretary.

Ormonde Clisham is now located with the Lynn Gas and Electric Company at Lynn, Mass., and writes enthusiastically that he is glad to be back in his old business. — Roy Hardy is chairman of the board of selectmen at Andover, Mass. — Roger Williams, who has been assistant general manager of the explosives department of the Du Pont Company, has been elected a vice-president of the company and a member of the executive committee. He becomes the company's advisor on research and development. — In April, 1943, Vern Tallman wrote Bob Moorhouse, inquiring about his new farming enterprise. Bob replied in August, 1945, which places him near the top in the long-distance correspondence class. Bob does give a good description of farming, including an answer to Tallman's criticism of low output from his Holstein cows, which Bob vigorously denies. Bob says that the farm would not amount to much without Mrs. Moorhouse's good management.

Leigh Hall and your Secretary both have sons who are Army Air Force lieutenants stationed at Wright Field, Ohio. On the afternoon of August 24, your Secretary's son was pacing the floor in the maternity

ward waiting room of the Field Hospital when in came Hall's son. Both boys became fathers within two hours of each other. The Hall arrival was a boy and was named Leigh S., 2d, for his uncle, Leigh's oldest son, who also had been stationed at Wright Field but was killed some months ago in an airplane accident. Your Secretary's grandchild was a girl. Your Secretary would like to hear from other members of the Class who are becoming grandfathers.

This year's Alumni Fund is coming along nicely, although Fourteen is slightly behind the class averages. We have reached 74 per cent of the class quota both as to numbers and dollars. The average of all classes is 78 per cent in numbers and 74 per cent in dollars. If the approximate 20 per cent of last year's contributors who have not yet sent in their contributions would do so promptly, our total would take a big jump, and Ross Dickson would be helped out of quite a bit of follow-up work. — H. B. RICHMOND, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

1915

Hello, classmates! Here beginneth the first column of notes for this year. For the Alumni Fund: on September 1, 130 of you (74 per cent) had given \$2,711 (92 per cent), an average of \$20.50 a man. Nice going! Only 30 of those who gave last year have not given this year. If they will give before the end of the year, we can easily hit that 100 per cent quota away ahead of schedule. As it is, it took us until December 1 last year to reach this same total percentage. Only five classes have a higher figure than 1915. Four of these are earlier than 1907. All older than we with much smaller quotas. Let's lead the whole list.

Summer jottings: In Detroit, a long talk with Loring Hall, Vice-president and director of United Carr Fastener Corporation . . . a ride on LeRoy Swift's cruiser from the Grosse Pointe Yacht Club. He is our own Speed Swift's brother and would like to check up on Speed's Boston jaunts, or haunts. Sorry, LeRoy, I don't know a thing! . . . In Buffalo, the Neals and the Hiltons entertained me royally and gloriously. Despite their machinations, however, I learned that you cannot dry up Niagara Falls in two days. . . . George Rooney has moved to a new house at 26 Bellevue Road, Belmont 78, Mass. At a Sunday housewarming dinner, I could see from George's handiwork around his new estate that he had really learned something in that famous Course I. . . . Les Heath is in a new location, at 15 Wharf Street, Boston 9, with his Ross Cutter and Machine Company. . . . George Moulton is in the engineering department of Submarine Signal Company, Boston. . . . Of course, I had the usual and fairly regular lunches and visits with the Boston gang, many of whom I see often. You'll all be disturbed to hear that Frank Scully was seriously ill this summer with an emergency operation for a perforated gall bladder. Frank is making good progress from this extreme condition and is now on the way to recovery. All our best to Frank. . . . Flash, flash! St. Elmo Piza is back from the wars. I talked with him in New

York, and he promises to give us some of his enlightening experiences in wartime England.

A bow to our own Fannie Freeman. An item from the Boston *Post* of March 31 reads: "The Village Athletic Club of Roxbury will honor O. Ricker Freeman at a testimonial banquet at the Copley Square Hotel on April 16. It was 26 years ago that Mr. Freeman, a graduate of M.I.T., an architect and veteran of World War I, saw the juvenile delinquency problem growing, and he began working to solve it. Without any organization he worked among the boys; he spent his own money to provide athletic equipment and other supplies, urged them to join recognized boys' clubs, and in other ways helped them. Now these former boys whom he befriended are to show their appreciation."

Maurice Brandt is our class representative on the Kurrelmeyer Fund committee, inspired and organized by some younger Tech men to raise a useful scholarship fund of \$4,000 in Dr. Kurrelmeyer's name, as a testimonial to our friendly feeling for him. A worthy cause to which we should all be happy to contribute. — Although I missed Sol Schneider on his summer visit to Boston, he was good enough to leave this note: "Sorry not to see you. Expected you in Philly last spring. Let Andy know when you expect to come. Regards to the gang."

Alert and loyal Dennie '11 sent this from the Portland, Maine, *Press-Herald* of August 24: "Alan Dana, chief engineer of the Kerite Insulated Wire and Cable Company of Seymour, Conn., worked two years in the development of the atomic bomb. . . . He and his brother, Norman P. Dana, are graduates of the Portland High School and of . . . Technology. Norman, a graduate of '20, worked as a chemist, and Alan as an electrical engineer. . . . Alan Dana, who holds a score of patents for insulated cable coverings in the United States and foreign countries, carried on his work in connection with the development of the atomic bomb both in the Kerite factory at Seymour and in the atomic bomb plant at Oak Ridge, Tennessee. He has been associated with the Connecticut company for 25 years."

Good old Jerry Coldwell seems a bit serious even for Jerry in his letter written en route to the West: "Now what do you think of our Knoxville project? It really seems strange to be able to write the word 'atomic' because for four years that has been a word that you didn't use. After the publicity release one of our executives very aptly said, 'Now some of the boys can come out from under the table.' It is a frightful amount of power to be in the hands of human beings, however, and even I wonder if it might not have been better if it had not worked for anybody. In other words, is the human mind capable of dealing with such a terrible force for destruction? I don't know — perhaps you have to deal with psychology and art in the field of psychiatry to work that one out. I do firmly believe, however, that civilization could be wiped out by its use. The bombs dropped were only a sample of the power that actually can be utilized." My word, is Coldwell turning into a moralist? . . . "I'm on my way back from Arkansas, where we are starting the clean-up of a detonator loading plant we have operated for the gov-

ernment for the past five years. In about three or four months we have decontaminated it and then we will return it to the Indians in Uncle Sam. We loaded over 900 million detonators, in fact, nearly a billion. They gave us the Army-Navy Production Award four times so that our flag has three stars in it. Naturally, I'm glad the whole thing is over. My two boys are both in the Army, and although they will not be out for awhile, they should both be out in time to enter Technology as freshmen in the fall of 1946. They were able to finish preparatory school work before getting into the Army."

Bill Spencer has been elected president of the Engineers Club of Baltimore for 1945-1946. The June issue of their *Baltimore Engineer* has a good-looking full-page picture of Bill. Little change from the old days, and if worse ever came to worse in engineering, the picture would be a fine recommendation for Bill in Hollywood. Henry Daley sent it from Philadelphia but unfortunately failed to write anything about himself.

Following our pleasant telephone conversation while he was in Boston by a letter from Albert Ramond and Associates, Tribune Tower, Chicago 11, Ill., Carl Dunn writes: "It was indeed a pleasure to talk to you in Boston. I am planning to take advantage of your offer to make an appointment for me to have a chat with Professor Schell, when next I can be in the East. . . . Under separate cover I am sending some of the recent printed material of our company. We are trying now to state clearly our principles and objectives, and are meeting with a fine response."

More glory is due Herb Anderson for able leadership of his company, according to this July clipping: "H. W. Anderson, President and General Manager of the Fidelity Machine Company with plant facilities in Northeast Philadelphia, has just advised the men and women of the organization that Under-Secretary of War, Robert P. Patterson, has recognized their outstanding achievement in developing and producing precision machinery essential to the war effort, and they have received the Army-Navy Production Award for the fifth time. This is the fourth white star added to the original Fidelity Army-Navy Production Award Flag and is recognition of the maintenance of an outstanding record for leadership in the field of unusual precision machine development."

As a regular class notes contributor, Herb writes: "I certainly received a most pleasant surprise last night when I arrived home and found your letter and the three pictures which you had so kindly enclosed. I did enjoy that meeting in New York, and from the smiling faces of our old classmates it is very apparent that we all shared something together. I seldom get to Boston, and in the last few years the nearest point has been the Belmont Hotel on the Cape at Harwich, where we have been in the habit of spending about three weeks each summer. I am now planning to be up there the last three weeks of August and only wish that I would have the good fortune that we ran into a few years ago when another classmate, Arthur Ball '15, was at the hotel for about 10 days while we were there. I was reminded of the incident when I noticed that the magazine *Time* lately had an excellent

article on Technicolor, and one paragraph stated that Ball, who was formerly with that organization, was now connected in special research with the Du Pont organization. We seem to hold quite a few of our classmates together here in Philadelphia, and 1915 always has one of the best class turnouts at the three meetings which the Technology Club of Philadelphia holds each year. In recent issues of *The Review* we have adopted the policy of indicating the members present with their class numerals, and I hope you will have time to follow faithfully the activities of this Club as *The Review* comes to hand."

Louie Zepfler was another New England summer visitor during the time I was out West. I am sorry to have missed seeing him. Here is his letter: "Your notes in the July issue were tops. I doubt whether I shall be coming to Boston, so if you have time for a short vacation with us at Minor, Mass., why not let us know and come down? Seems too good to be true that this war is about over — that is the way my boy wrote from the Pacific, and I feel the same. I hope we can get together for a reunion."

If that famous New York party last spring accomplished nothing else, it brought Tom Huff out of 30 years' retirement. And *how* it brought him out! He wrote this letter on the 8th of June: "The letterhead is my own Management and Research, Inc. We have been in existence since 1932, have done a large amount of aircraft engineering work in the past, and are at present developing certain aircraft for the Army, as well as acting as manager for the Pennsylvania Aircraft Works Parts Company here in Upper Darby, Pa., and also as engineering consultants for aircraft work of the Brasco Manufacturing Company, of Chicago, Ill., where I have been active for the past four years. With regard to my family, we have just had the good news that my son, Thomas H. Huff, a captain in the Army Air Forces and former commanding officer of the 36th fighting group, located in New Guinea, will be given his discharge based upon four years of service. Tom has done an excellent job and received a number of medals and citations, which of course, he treats with the usual feeling that the boys in the service have for their work: they figure they had a job to do and that the honors do not mean much if it was work that had to be done. My younger son, John, is stationed in Alaska, operating with a harbor craft detail, as a corporal. He is really a sailor in the Army, operating a small boat about 125 feet long that carries freight, and supplies to the boys in the Aleutians."

"My oldest daughter is at home and active in business. My younger daughter, Mary Craig, has just been married to David Shirk Evans, a lieutenant in the Naval Reserve, and they are at the present time living in New York, as Dave is stationed at Lido Beach, preparatory to going out to the Pacific. . . . My wife and I are trying to enjoy a little vacation at the seashore, but the very cold weather has made it most difficult to keep warm and dry sailing. I am looking forward to seeing you, in spite of the fact that we are not having a class reunion, and certainly hope that we may get together in the fall."

Another missing member shows up — Clyde MacKenzie, unheard of, lo, these

many years! He is now with Charles A. Maguire and Associates, Turks Head Building, Providence, R.I. At a pleasant lunch Hoot and I went back over the years. His son Bruce is at West Point. I had a letter from Clyde in June: "You will note from this letterhead that I am located at 11 Pemberton Square, Boston, where we have recently opened a Massachusetts office particularly in connection with the Meridian Street Bridge which we are designing." — John Dalton, technical director of the Pacific Mills in Lawrence, Mass., was the American representative of the American Association of Textile Chemists and Colorists at the Canadian Association's outing in June at the Sherwood Country Club in Sherwood, Quebec. John gave a paper at the technical meeting. He says he was surprised how little so much of what we don't have costs in Canada.

How's this for class spirit? Harold Colby writes to make up for missing the Boston dinner: "I fully intended to join the boys at the class dinner on May 18, but conditions beyond my control prevented attendance. I know you had a grand time. You always see to that, and from the notice of the event I feel that you again were doing your bit to provide an entertaining evening. V-E Day may have brought relief in a great many ways, but our business is still among the *musts* and believe me it is quite a strain. But when V-J Day comes — the sky is the limit. Give my regards to any of the boys you may meet in your travels." — Shortly after Boots Malone was made a director of Norma Hoffman Bearings Corporation, at Stamford, Conn., he felt so disappointed over the canceling of our reunion that he sent me the notice of 1910's 35th reunion in New York City. Charlie noted on it, "Should we let these '10 old men put one over on us?" Sorry, Charlie, but we just had to let them do it this time.

San Willis, Mississippi Glass Company, St. Louis 7, Mo., wrote: "Many thanks for the timetables. You may be sure I will use them if I can possibly make the journey to Maine via Boston. I cannot promise, since this whole trip is mixed up, and Boston is the only city in the East that I do not have to visit at this point, and I am going to be hard put to make the circuit and still have two weeks in Maine. A friend of mine here, who gets to Boston every few weeks and is much interested in things magical, has expressed an interest in meeting our classmate, Bert Adams, and I should like to oblige with a letter of introduction. Should you see him meanwhile, you might mention the matter of my letter. My friend is Blix Donnelly, pitcher for the St. Louis Cardinals. While you people in Boston have been sweltering, we have been having glorious weather. It was 57 degrees early this morning and never reached 80 all day, nor for the past three weeks, for that matter. I came out here expecting to melt, and last night I was scouting about for a blanket. Best regards to all the gang." As a live baseball fan myself, I should be thrilled to meet that Cardinals pitcher and am looking forward to introducing him to Bert Adams.

It is sad to recount the passing of another classmate. Roscoe Gilkey Dickinson, dean of the graduate school of the California Institute of Technology, died July 13. Professor of physical chemistry, Dr. Dickinson

went to California in 1917 from Technology. He was famed for his work in determining atomic structure by the use of x-ray and in the field of photochemistry. He had devoted all his time in recent years to research problems for the government Office of Scientific Research and Development. He leaves his wife, Mrs. Madeline Dickinson; a daughter, Dorothy; a son, Robert W. Dickinson, a lieutenant in the Navy, all of Pasadena; and his parents, Mr. and Mrs. George E. M. Dickinson of Hyde Park, Mass. Our sympathy goes out to Dr. Dickinson's wife and family, to whom we have written.

In addition to the famous weather Los Angeles boasts, our classmates there claim the distinction of having had a 30th reunion all by themselves. They did a good job of it and deserve our hearty approval for such fine spirit. Ray Stringfield reports it: "Several things of interest to the Class have occurred here; I will try to cover them one by one. As you will see by the enclosed clipping, we have lost another classmate. Roscoe had done a lot of good work over at Cal Tech. He was always so immersed in his work that none of us saw him very often, but every once in a while a journal article or some newspaper publicity would let us know that he was still working. We didn't know that he was ill until this notice came out. I called Ken Kahn, and as neither of us was able to attend the funeral, we sent over a spray marked 'Class of 1915, M.I.T.' Transportation being what it is, we were lucky to get a handful of us together here in Los Angeles to remind us that we've been away from the Rogers' steps for 30 years. Ken Kahn acted as spark plug and supplied a barbecue supper on June 5 over at his cozy Hollywood back yard under the sycamore trees; he even dug up real steaks, in spite of the ration points. Nine of us got there, the others beside Ken and me being Jim Carson, who is practicing architecture in these parts; Harold Crowell, who is still running Weymouth Crowell Company and has constructed many of the big buildings around here; Dave Hughes, gentleman capitalist; Bill Mellema, just back from engineering work in Alaska and reopening his construction office here; Walt Rivers, contractor and as full of the devil as ever; Otto Strahlmann, now in the engineering department at Lockheed; and Bob Welles, who circulates between here and his cattle ranch in Arizona. Elwin Norberg, who is chief architect for the Los Angeles city schools, had expected to be there, but at the last minute his duties as grand high priest of the Royal Arch Masons of the state of California called him out of town. Ken Kahn is still at Lockheed and seems to be busy as ever."

"I have merely jumped from the frying pan into the fire. Cutbacks in the airplane program made it so I thought I could take life a little easier, and I arranged to leave Consolidated Vultee on July 1, after my three years and a half there, expecting to spend about half my time as technical director of Reeves Rubber, Inc., at San Clemente, Calif., where we have about 150 men and I've had an interest and been chairman of the board for some time. So what does the president do but get sick, and I find myself acting general manager, commuting the 65 miles between Los Angeles and San Clemente two or three times a

week and trying to get out as much production as we can with the present shortage of rubber equipment and at the same time get lined up for what looks like some very good postwar business. San Clemente is right on the beach, though, and the weather is fine. When the Navy loosens up, we can give you some good fishing again, and in the meantime, come on down anyway, and we can at least give you a good dinner and a ride around Balboa Bay. I believe my wife sent you an announcement of my oldest daughter's wedding, just to keep the class records up to date. Both my girls are waves, and Margaret, who is at the Naval Air Station at Alameda, Calif., finding her boyfriend discharged from the Army and at work in San Francisco, couldn't see any reason for waiting any longer. All of which gave us an excuse to go north and then sneak into the Yosemite and rest for a few days. My boy, Bob, is still out in the Pacific with Halsey's Third Fleet and about 20 battles to his credit so far. He says he is going to study mechanical engineering when he gets out, so we may yet have him back at Technology. Look us up if you ever get away from your New England atmosphere." On Saturday, June 30, Margaret Jane Stringfield was married to Donald Earl Waggoner, Jr., at Berkeley, Calif. All the best from 1915 to the young couple.

With the war over, our deferred 30th reunion comes to life. A Boston dinner on November 2 will start it off, supplemented by New York and Philadelphia dinners. As soon as your committees have reported, the first mailings will go out. Plan to save a week end in late May or early June for that Victory reunion — of which more later. — Our class slogan, "Help Azel," has spread, doing good through the Class in many ways. In addition to my personal experiences and benefits, many examples of favors done for classmates by other classmates have come to my attention. Confidences sealed by wartime stringencies and restrictions prevent my telling you my own experience of many kind things done for me both in business and socially; other chaps say the same thing — an example of what the years of close friendship truly mean. During the summer I received many testimonials to the effect that our class notes are "tops," especially those in the issue of last July. Modestly, I disclaim any such credit, for these are *your* notes. Your interest in reading them and your interest in writing them assures our success and goes all the way to help Azel. Many thanks, many blessings! — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1917

The atomic bomb was produced under the direction of Leslie R. Groves, a major general, as head of the "Manhattan Engineer District" — a name given to insure secrecy. Groves made his reports orally to the Secretary of War and the Chief of Staff. He built the three atomic bomb-producing plants and directed the expenditure of the two billion dollars set aside for the project. Groves spent two years with the Class and then went to West Point, where he received his commission in 1918.

It is impossible to keep up with other military activity. Bill Sullivan, of course, continues to attract the interest of newsmen, and the beautiful round dome of

"bald, burly Commodore William Aloysius Sullivan" appeared in *Time* for July 16 with a long article. A recent letter from him said that he had recovered a tremendous number of wrecks from Manila Harbor, and was about to return home when indications came that Tokyo might be his next call. He has been one of the busiest men in the armed services with no leave for several years. At Manila he entertained President Compton and Dean Moreland on their way to Tokyo. — Irving B. McDaniel is now industrial manager of the Fifteenth Naval District, with headquarters in the Canal Zone. He had been supervisor of shipbuilding for the Sixth Naval District, residing in Savannah. During the peak of the shipbuilding program in Captain McDaniel's district, there were 22 shipyards under his supervision.

Also interested in shipyards is George H. Stebbins, and Ben Ireson Lewis was good enough to send us the following note about him: "Mrs. George Stebbins was recently sponsor at a christening ceremony for APL 49 at Puget Sound Bridge and Dredging Company, Seattle, and did a masterful job. 'Never was a ship handed such a wallop,' said H. N. Wallin '21, a captain in the Navy and the local supervisor of shipbuilding. But very gratifying to us was the praise accorded Steb himself for four years of excellent results as general manager, by Captain Wallin and also by H. W. McCurdy '22, President. In 1944, for example, the Navy wanted 30 ships; Steb would only promise 26, but actually delivered 32. The Stebbins' two sons are in the service: G. H., Jr., navigating a bomber in the Dutch East Indies; Bob, who left his classes at Technology, completing training in Florida. The daughter, Dorothy, is married to Charles Lilly of Seattle, who is at this writing off Okinawa, and is in the meantime helping her father accomplish so much."

James Doon, a major in the Coast Artillery Corps, paid a visit to his son, Lieutenant Doon, and sent home a snapshot of father and son in Europe. We sent the print to two or three of Jim's special friends, and another copy or two can be made for anyone who is especially interested. Jim's son is taller and much more handsome than the Judge. — Formal notification has been received of the death last December 15 of Francis S. Conaty, a lieutenant colonel. It is understood that he died as the result of a bomb while being transferred as a prisoner from the Philippines to Japan. — In June of this year, H. W. Collins, a colonel, was awarded the Bronze Star by the commanding general of the Sixth Army Group, and also the Croix de Guerre by the commanding general of the First French Army. — Brigadier General Hegenberger has received a second star and, we understand, is commanding general of the Fourteenth Air Force.

Gus Farnsworth, during a summer game of softball, fell and broke three ribs. Subsequent examination showed a collapsed lung, and Gus was out of action for several weeks. He returned to work at Coverdale and Colpitts about the first of August. Rudy Beaver was also laid up briefly and wrote that he was repaired by Dr. George Morse at the Brooks Hospital. His convalescence was to include a week's fishing on Connecticut lakes and some time in northern New Hampshire.

From Pennlock, in Meriden, N.H., Phil Hulburd writes: "We have been having a quiet time and have spent our days either working in the garden or canning the produce. The last operation has kept us right out straight since the stuff began to mature. Just now the corn is beginning to come in, and we aren't yet anywhere near the end of the beets and beans — and I think we'd better dispose of the balance in the market, as we are surely fed up with all the 'washing and peeling business.' . . . Bob is at the moment at Norfolk as a communicator at the Amphibious Warfare Training Center, but as that is to be closed, or perhaps already has been, he will probably be moving on to something else. I think he'll be disappointed not to get a look at least at the Pacific, and I imagine he'll try to wangle an assignment that will take him out there for a bit. . . . Lucy is going to work at Dewey and Almy in September in their architectural office."

Lucius Hill reports a visit from Bill Hunter in Boston recently. We understand Bill has been quite ill, and hope he has by now completely recovered. — Kenneth E. Bell, technical director in charge of A. C. Lawrence Leather Company's research and laboratories, has been elected a vice-president of that company. Ken, who has been with the company for 22 years, is also an expert consultant to the Office of the Quartermaster General in Washington, D.C., and is a member of the research laboratory committee of the National Tanners' Council.

And here is a recent note from Dud Bell, sent from Cape Cod Village at Hague on Lake George, N.Y.: "Thanks so much for your letter and picture of Jimmy Doon and son. I always think of Jimmy in connection with the days at summer camp when he and I shared the same tent. . . . I am writing you from one of the most desirable spots in the world. Helen and I have our own cottage here with all the work being done by a well-managed organization. We have hired a boat which accommodates my outboard. Yesterday we hauled in a string of bass, and the whole setup is ideal for us. Next summer, we hope to return for a month. . . . Last spring I was called on the telephone from Philadelphia by Hubert Wellcome. You no doubt recollect that he played on our football teams back in 1917 and 1918. I knew him quite well then, so it was nice to invite him to Bristol and renew the friendship. Hugh is most unusual in our Class in that he is an inventor. At this stage of the game, he has gone pretty far. He invented the laying of telephone wire from airplanes, and later rockets. He has recently completed an invention for raising a man from the water by airplane (at 350 miles or more) without a jerk. The government has bought his last invention, and it is now being manufactured. Hugh's address is Pleasantville, N.Y. He is very successfully retained by some large cable company and the Navy. . . . Thanks again for your letter. I sure would like to see you. I have also been back in commercial life with the Hampden Specialty Products Company, Easthampton, Mass., and somewhat on the lines of Wellcome. This concern has retained me to convert them into civilian manufacturing. Just now they are producing large bomb casings on a mass production basis. . . . Fritz Althouse now mines

coal with a bulldozer. No more shaft mines with that boy. He takes the whole mountain down, beginning at the top. . . . That's all the news, except to say that I heard from McGrady, who has not been well. He took a rest down on Nantucket, as you may know."

Dick Loengard is now president of United Chromium, Inc. He was in Boston in the middle of September, and we had a pleasant and extended chat with him on various matters. The first word of Dick's advancement as president came from Leon McGrady, who asked if we had had any word from Paul Bertelsen. The answer is "no." Perhaps somebody will be good enough to enlighten us. — William Henry McAdams, Professor of Chemical Engineering at Technology, was awarded the honorary degree of doctor of science by the University of Kentucky at its June exercises in Lexington. He is a native of Kentucky.

John L. Parsons, who has been chief of research for the Hammermill Paper Company in Erie, Pa., for some years, severed his connection with that company on July first to become director of research for the Hollingsworth and Whitney Company at Waterville, Maine. The latter company is establishing a research department; John has the job of organizing the staff and setting up the laboratory and library. He and Mrs. Parsons, with their daughter Priscilla, spent the month of July with his mother in Rye, N.H. The oldest son is somewhere in the Pacific. Donald entered Technology with the freshman class in July. John himself took over the new job on August first, but the family will remain in Rye for the present.

Edward P. Warner was recently elected president of the world aviation body at the annual meeting in Montreal of the provisional international civil aviation organization. He has been with the Civil Aeronautics Board in Washington for the past six years. — Lewis W. Douglas, President of the Mutual Life Insurance Company in New York, has been named adviser to the deputy military governor for Germany, according to an announcement made by General Lucius D. Clay, General Eisenhower's deputy military governor for Germany. Formerly a congressman from Arizona, he has also served as director of the Federal budget, vice-president and director of the American Cyanamid Company, and principal of McGill University in Canada. During the war he served as deputy war shipping administrator. Lew wrote friends that he had been jeeping about Germany and was especially interested in the new developments in petroleum technology. As an incident in his travels, he discovered and captured the inventor of jet power units used on bombs and planes.

In June, Ted Bernard sent out postcards and notices warning that there would be another spring week-end get-together. The responses were limited in number, but nevertheless, those who met at Gloucester had no regrets. In the group were Ted, Rudy Beaver, Art Dickson, Walter Gartner, Lucius Hill, H. E. Lobbell, Frank Maguire, H. E. Strout, and Ray Stevens. It is hoped that another year more of the Class, especially in the Boston area, will decide to participate, as the occasion, while a quiet one, is always most pleasant. Moreover, the total expense is moderate. The

gathering is definitely not limited to any one group. Unlike the five-year reunions, however, no special effort is made to obtain a large attendance, and those who come do so only if they can enjoy the gathering without special or formal plans.

The following letter sent to Dean Pitre after the meeting by Win McNeill, our Class President, will be self-explanatory: "Several weeks ago an august assembly of 1917 class members took place near Boston to discuss important class problems. It is my very pleasant duty to write you an official letter notifying you that you have been elected a most distinguished honorary member of the Class of 1917. This gives you the privilege of participating in all 1917 affairs of state, drunks, brawls, and other activities in which members of the Class at their mature age may indulge. The fact that you were not elected to class membership prior to this date is probably due to the fact that the average dignity of the members was not up to the level necessary in order to make you an honorary member. May this association never be a blot on your career."

The Erie Railroad was so proud of its board of directors as now constituted that on June 1 it sent out an elaborate little brochure giving the picture and a brief life history of each of the members of the board. One of the few significant changes in the board, and possibly the change that led to the brochure, was the addition of Edward P. Brooks, Vice-president of Sears, Roebuck and Company, who was born in Westbrook, Maine, shortly before Rudy Vallée arrived there. Almost immediately after his election in the spring, Penn left for China on a major government assignment concerned with the industrialization of that country. He conferred with all the principal Chinese officials, most of the American authorities, and official delegates and ambassadors, and others concerned. He even attended at least one social function at the residence of the French ambassador in Chungking; and thereon hangs a tale which we leave for Penn to tell at some 1917 get-together. He is now back in Chicago.

Stan Dunning was good enough to write us of a recent trip to England. His letter follows: "You and Phil Hulburd do a good job on the class notes, and could do even better if all of us were to take a hand from time to time. So here is a little contribution about some of my doings."

"Early in May I left on a business trip to England and returned only recently. Since my travel priority was not high enough to fly, I went by steamer, which I was very glad to have done for it gave me a greater appreciation of the splendid organization of our convoys and their protection. I landed at Glasgow and went immediately to London, where I spent most of the five weeks. It is too bad that security regulations have limited the information which we, on this side of the Atlantic, have had regarding the terrific conditions that the people of Britain have put up with for five and a half years. We have simply no conception of their total mobilization and the valiant way in which they have carried on."

"I was repeatedly asked whether I was surprised at the damage in London. My reply was that I really was not surprised but I was appalled. On seeing the terrific

amount of devastation, I could not help but wonder how the City and people contrived to get along. One's imagination had to visualize what it meant to maintain the services of a large city under such trying conditions. To have kept a semblance of service by telephone, electricity, water supply, ground and underground transport, and sewage system with no more than the temporary dislocations that did occur is simply marvelous. And for the people to have come through as they have, with spirits high and chins up, is a great tribute to them."

"The battle is not over, for the shortages of practically everything will continue for some time, and we here have not the haziest idea of what those shortages are, whether they be housing, ordinary daily requirements for living, raw materials, finished goods, or what. The official estimate is that the present living standard in England is about 35 per cent what it was in 1939, and that, I think, can give us some comprehension of what those people have faced and are facing. It was a most interesting trip, and I came away from England with great respect and admiration for the way her people have carried on in the very face of the enemy."

More of the saga of Tourtellotte pigs has been published in northwestern farm papers. Neal has made history in the region by his plan of furnishing pigs from his litters to Future Farmers of America boys, who are thus started on the road toward large stocks of purebred Hampshire pigs. From the first litter one weanling is returned to Neal's Janalu Farm. The rest of the litter remains the property of the F.F.A. boy. It is probably a safe bet that many future champions will be named Janalu, or possibly even Tourtellotte!

Harper's Magazine for May has an article, "Italian Art under Shellfire," written by Herbert L. Matthews, which will be of especial interest to former members of the Tech Show organization, and to other intimates of J. Paul Gardner, who is now a lieutenant colonel. An excerpt from the article: "The setup in Italy . . . stems downward from the Allied Commission, which is under the control of Allied Force Headquarters, and that in turn is under the ultimate authority of Washington and London. The AC has a Subcommission on Monuments, Fine Arts, and Archives headed by Lieutenant Colonel Ernest T. DeWald, Princeton professor of the history of art. His deputy is a Britisher, Major J. B. Ward Perkins of the London Museum. Under them are certain regional directors whose duty it is to go into captured towns and cities more or less with the attacking troops and make quick surveys and take first-aid measures. There are three principal officers — Major Paul Gardner, director of the William Rockhill Nelson Gallery of Art of Kansas City, for southern Italy and Sicily; Captain Deane Keller, of the Yale University School of Fine Arts, with the Fifth Army; and Major Norman T. Newton, of the Harvard Faculty of Design, with the Eighth Army."

Poh Yuan Hu is in this country for the first time since shortly after the last war, with a mailing address at 18 Mellen Street, Cambridge. During May and June he established headquarters in Cambridge and conducted studies at the Lindgren Library

at the Institute. He has had an interesting career, starting with a degree in petroleum engineering, obtained at the University of Pittsburgh the year following his graduation from M.I.T. He then went to the National Tool Company at McKeesport, and later with Jones and Laughlin and Edgewater Steel, where he was in charge of the metallographic work on production of ordnance steel for the government. On his return to China, his first work was with the Lungyen Iron Works, and then in charge of operations of the Tayeh Iron Works, where equipment included two 450-ton blast furnaces. He joined the government of the present Republic of China in 1928 and was for five years the first director of the technical department of the Ministry of Economic Affairs, his office moving as the Chinese capital moved. Concurrently, Dr. Hu has been director of the Sichang office of this ministry and in this capacity has discovered important new deposits of iron and coal. As another side activity, he was until two years ago president of the Tangshan Engineering College, which, with its thousand students, is the M.I.T. of China. His son, who is probably the oldest offspring of the Class, is 32 years old, or even 33 if you use the Chinese age system. The son has obtained the degree of M.S. from the University of Manchester in England, and is now associated with the Bank of China.

Harry Toole has written Leon McGrady these few notes about himself, which will be of interest: "Al Wendler called me and said you had asked about me. . . . My activities during the past several years have been varied and interesting. . . . I was stationed at our acetate division (E. I. du Pont de Nemours and Company) plant at Waynesboro, Va., for a couple of years working on some interesting projects and was called back to Buffalo in the fall of 1936 to participate in the development of a new fiber process, subsequently known as nylon. In 1938, we moved the work back to Wilmington, and I continued with it on a 100 per cent basis until after the first commercial plant was in successful operation. This was undoubtedly the most interesting work I have had in all my years with Du Pont. . . . I am back in the rayon department engineering section here in Wilmington, now working on problems of interest to the various yarn divisions. We have been living in Swarthmore for nearly seven years. It is beautiful there, and we enjoy it very much. . . . Our boy has been in the Army Air Forces for about two and a half years, and we expect him home on furlough this month. . . . I get to the Philadelphia Alumni dinners once or twice a year but haven't been back to the Institute for several years now, although I spend an evening at the old homestead in Cambridge whenever business takes me anywhere near Boston."

And a personal word from Hubert E. Wellcome, in his letter to Beverly Dudley '35, new Editor of *The Review*, runs as follows: "Thank you for your kind letter of August 20 relative to an article for *The Review*. Unfortunately, practically all of my work with the Army and Navy is restricted. I can say that I disclosed the exact method now used in laying telephone wire from airplane, even to the packaging of wire in unit lengths and the pulling out of

same by colored parachute. The Bell Laboratories, however, have done the development work on this, and time will show whether or not I was first on it all. I was informed that my method of winding the telephone wire was superior in that there never was any breakage of wire with my system. My method of coiling strand and cable eliminates the inertia of wire as on a reel, and therefore I am able to shoot steel strand and cable at extremely high speeds, said strand and cable being payed out without liveness or kinks. Furthermore, the speed may be varied. . . . I have done some work that the Coast Guard is interested in. Shoulder guns are used to fire lines to shipwrecked vessels, but steel wire or strand has a weight and drag differential over cotton or nylon. . . . When I am granted permission to write publicly about the air-sea rescue device, I shall be pleased to give you a story." — **RAYMOND STEVENS**, Secretary, 30 Memorial Drive, Cambridge 42, Mass. **PHILIP E. HULBURD**, Assistant Secretary, Phillips Exeter Academy, Exeter, N.H.

1919

Greetings to the Class with hopes that all have had a successful summer and are plunging into the postwar period with renewed vigor. Many of the Class during this period have shifted their field of endeavor from active war work to postwar activities. By 1946 we should all be completely engrossed in peacetime occupations.

Our Class has been more closely knit by our 25-year reunion and our 25-years-after publication. The Alumni reports of the Alumni Fund, however, indicate that more of our Class should be subscribers to *The Review*. The final figures for 1944-1945 showed 83 per cent of a quota of 155 contributors and 52 per cent of a money quota of \$2,700. The record for this year, as of August 31, shows 11 less contributors and 4 per cent less of money quota. Any new subscribers to *The Review* that the Class can obtain should be solicited for the good of the Class and of the Institute. — Further comments regarding the 25-years-after publication were received from many of the Class. Professor Svenson writes: "The committee is to be congratulated on the excellent results of such a difficult task. Here's hoping that the class spirit continues, as I am looking forward to an even better 50-year book." — Leo A. Kelley comments, "Congratulations on doing a sweet job." — Bertram H. Southwick writes, "You did a good job. I wish I could have been at the reunion." He adds, "No new news. I'm still plugging along at my 48-hour-a-week schedule with occasional night-Sunday sessions—all war work, keeping the General Electric plant at the River Works operating."

Bob Hackett writes, "The book was very good." — Leighton Smith's letter reads: "All concerned deserve a vote of thanks from the Class. I hardly ever see any of the crowd now, but Hy Selya telephoned a few weeks ago, and one of these days we will combine the movies we took at Norwich to show at the next reunion." — Howard McClintic writes: "The year book was very fine. I hope it was worth the effort. We have changed considerably — perhaps we look better than we did then, even if we don't feel better. I am still in the

Navy but hope to get out this year." — Robert R. Litehiser, an Army colonel, writes, "I have received a copy of the 25-year book and find it most interesting." — Hy Selya writes: "A very thrilling thing happened to me as a result of the 25-year book. Russell Hamilton, with whom I had lost touch for the past few years, wrote to me the day after he received his book, and since he comes to Boston about every three months, I was able to have lunch with him lately. It was wonderful to spend two hours of reminiscence with him after 27 years, since we had also been to high school together. He hasn't changed any more than the rest of us and is now in the plastics division of the Du Pont Company in New Jersey. Some of the other boys may have similar experiences as a result of your efforts." — T. M. Lloyd writes: "The 25-year book is very interesting. It is too bad no more of the Class co-operated in getting their pictures and statistics into it. I was sorry I could not get around to the latest dinner and hope to see you all sometime at a later date. I am being kept very busy, so much so that I shall have to forego a vacation this summer."

Ralph Jope '28, director of the "Register of Former Students," commented as follows on his copy of our book: "I appreciate receiving this splendid record of the accomplishments of the Class of 1919. It is very well done and will be a splendid record for us to have in this office." — Mrs. Davis Proud Minard, 1010 South Orchard Street, Urbana, Ill., acknowledged her copy as follows, "Please thank the Class for the copy of '25 Years After' which arrived safely. I shall treasure it, along with the 'Technology War Record'." — And thank you, too." — Mrs. F. J. Rasmussen, 7 Erwin Park, Montclair, N.J., writes, "It was awfully good of you to send me the copy of '25 Years After.' You men who worked on it did such an expert job that I enjoyed even the parts about men I didn't know. Fred Given did the history in such an interesting manner. My 13-year-old son, who is away at camp right now, will get a big kick out of reading it when he comes home. He is hoping to go to M.I.T., but that will be dependent on his getting a scholarship, and I don't know whether that can be accomplished. Thank you so very much for sending me the book. I deeply appreciated your thought in doing so." — Walter Humphreys '97, Secretary of the Corporation, and also Secretary and Treasurer of the National Association of Wool Manufacturers, writes: "Please accept my cordial greetings and compliments for the make-up of the class book, so well done in a time when it is difficult to produce such publications."

Professor Robert S. Williams '02, Deputy Dean of Engineering, writes: "It was good to hear from you directly even though your letter was very brief. I remember very well our earlier contacts when I was a chemist. Please accept my sincere thanks for your 25-year book." — Mrs. Edward F. Pierce, Jr., 83 Vinton Street, Melrose 76, Mass., writes: "I received your letter of June 29, telling me that you are sending me a copy of '25 Years After.' It was very thoughtful of the Class to do this, and I shall appreciate having the book more than I can tell you." A further letter received from Mrs. Pierce reads, "This is to let you know that

I received the class book, '25 Years After,' forwarded to me from Virginia. It is very well written and put together. The committee must have done a tremendous amount of work to get all the facts and pictures for it. My sincere thanks for sending it to me." — Marshall Balfour from India commented on the 25-year book as follows: "Recently I received a copy of the volume '25 Years After' commemorating that period for the Class of 1919. It seems excellent to me; my congratulations to you, to whose conception and perseverance much credit is due, and also to the publication committee and others who helped. As you predicted, the phototyping and photo reproduction turned out very well, I find. My only criticisms would be that the attachment of contents to cover is weak and someone's secretary might have arranged the alphabetical list with surnames first! These are small points, however, and on the whole, the result is one of dignity and good spirit; again 1919 sets a high standard. I was glad Mrs. Balfour could attend the New York luncheon which preceded the reunion. Since distance halfway around the world intervened between me and the 25th reunion, it is some consolation to have the story and record of that important occasion. I have, of course, carefully scrutinized the biographies and portfolios. There is the evidence of what 25 years have done to some of us. The percentage of photos after 25 years is even better than that of Technique itself; a few seem better looking and almost as young 25 years after as before. I have just completed arrangements to fly to the United States in September for a short visit, returning to India late in October."

Mrs. Robert F. Morrison, 32 Heathcote Road, Scarsdale, N.Y. writes: "Upon returning home, I found a copy of your '25 Years After,' which you so thoughtfully mailed me. Thank you very much. I find it most interesting. The children will enjoy it some day, too. My very best wishes to you and the Class." — Roger T. Hall, a commander in the Navy, writes: "I want to congratulate you and the 25th reunion committee on the success of your efforts in planning and executing the big affair last summer. After reading all the details in '25 Years After,' I am convinced that my absence was a real personal loss and one of the great regrets of a hectic lifetime. The book reached me yesterday and for the past 24 hours has been the most welcome diversion from the pressure and beehive activity out here on Tokyo's doorstep. While my close connection with the Pacific war for the past three and a half years has deprived me of my private life during this period, there have been compensating features in this service. At present I am undecided whether the rugged experiences involved in advanced base development in the Aleutians, the south Pacific, and now the west Pacific, have contributed to the lengthening or shortening of my life span. From this spot overlooking the East China Sea, it appears that we have the Japs thoroughly licked, and we hope to have it over and be home in private life by Christmas. Once the pressure is relieved, I want to get around and meet some of the '19 old-timers.'" — Richard S. Holmgren writes: "I have been on the move and am now located with the San Diego County Water

Authority as principal assistant to the general manager and chief engineer. Our job is to bring the Colorado River water into San Diego County. I have enjoyed reading the class book and only regret now that I did not take the bull by the horns and attend the reunion." — Mrs. Stanton H. Breed writes: "Thank you for so thoughtfully sending me the book entitled '25 Years After.'"

Bernard S. Coleman has just been appointed public panel member of the ninth region (Denver) of the National War Labor Board. — On June 15 New York members of the Class held a dinner at the Technology Club at which the following were present: Jacob Braverman, Ray Bartlett, Ken Davidson, Fish Gilbert, Fred Given, Leo Kelley, Karl Rodgers, Russ Palmer, and Gene Smoley. The group sat around and talked for several hours. — Francis A. Weiskittel, 2933 North Charles Street, Baltimore 18, Md., offers the following news: "Our first son and only child to date was born on May 9 and named Anton Carmine Weiskittel. I am still stationed at the Army office of Glenn L. Martin Company, Middle River, Md., and am chief of the plant clearance section, engaged in termination inventory for surplus property disposal."

Hy Selya covered the Alumni Dinner on June 23 at which Carl Nutter, Chet Stewart, Maurice Role, and George McCreery were also present. Hy writes: "The five of us who were present send you our greetings on the enclosed card. We shared a table with two 1916 men and three 1945 men. The meeting was quite well attended, by about 850, and it was thrilling to hear the announcement of the two gifts, amounting to \$450,000, from Swope and Sloan of the 50-year Class. The Class of '95 as a whole didn't do so badly either, with a gift of \$25,000. To quote George McCreery, 'We were simply atmosphere.' This doesn't discourage me, however, because if the heart and mind are willing, our pocketbook may someday be able to respond. George told me that he had been in touch with Bob Hackett and Bill Banks, but that they could not attend. Jim Holt had started on his vacation, and Carl Svenson was not able to be there either. I had seen Ark Richards earlier in the week, and a previous engagement kept him from being with us. So far as I can learn, no one in our Class attended the Class Day exercises in the afternoon. You are no doubt familiar with the doings of the five of us who attended the dinner. Apparently there is nothing new. I am happy to say that George McCreery tells me that he is feeling very much better. If, and when, you should write to him, ask him what he is doing with the bottle caps. He insisted on opening all the beer bottles at the table, and I kidded him, saying that he must be saving the caps for some ulterior motive. Freddie Britton, who started with us and finished with the Class of 1920, came over during the dinner and exchanged greetings with all of us and asked to be kept informed of any doings in our Class in the Boston area. He lives at 8 Bedford Street, Lexington, Mass."

Edward Adams Richardson, 17 West Garrison Street, Bethlehem, Pa., sends the following item: "Mary Elizabeth (Duhig) Wilbur (Mrs. Warren Packer Wilbur) and Edward Adams Richardson were married on June 16 at her home, 17 West Garrison

Street, Bethlehem, Pa. After a short honeymoon the couple will be at the home of the bride." — Alex Wiren announces the publication of his book *Practical Management Research* by McGraw-Hill. — Thomas H. Bott, Jr., reports: "Daughter Joan is entering her sophomore year at Mount Holyoke College. I have been elected vice-president of the Financial Advertisers Association of New England." — Aubrey P. Ames, 16 Sea Street, Camden, Maine, writes, "After spending 37 months in a Japanese prison camp in Manila, I returned to the United States in April of this year. The intervening time has been spent in recovering 60 pounds of weight and re-establishing connections with the civilized world after being cut off from it for so long. I am still with the Standard-Vacuum Oil Company and expect shortly to resume work in the oil business."

Jacob Braverman sent in the following news of himself: "I was married in 1925 in Baltimore, Md. We have a son, 17, and daughter, 14. My son will probably go to M.I.T. in 1946. I am now employed as general manager of Empire Corrugated Container Corporation." — Arthur H. Blake, a major, writes from the Carrousel and Tuileries, Paris, "I spent a few days across the street from this picture last week and am now visiting London. I put in a very warm and dirty summer in the Mediterranean area and am glad to get a cooler country. I expect to fly back to the United States soon. I haven't seen a Tech man anywhere in Europe. Where are they?" — Marshall Balfour writes further: "I arrived in New York on September 7 after 54 hours' flying from Delhi, plus eight days' waiting in Casablanca. I shall be here until the end of October, when I return to India and China." Bal dropped in and visited with your Secretary on September 21; he looks well. He left his wife in India and is now with his two daughters in New York. He wishes to be remembered to the Class. — Wayland S. Bailey writes: "I have been teaching at Tech for nearly two years and enjoying it hugely. I have had two salt water fishing trips with professors Cowdrey and Hesselshwerdt. We caught plenty of fish both times, but a stalled motor made us late home from the second trip. All in all, faculty members proved good oarsmen."

The Boston News carried the following on March 14: "Robert P. Hackett was elected treasurer of Nichols and Co., Inc., at the annual meeting of the corporation and also was re-elected vice-president. John H. Nichols, Sr., who has been treasurer since the formation of the concern, was elected vice-president. . . . Mr. Hackett is a graduate of . . . Technology. . . . In 1929 he joined Nichols and Co. as assistant wool buyer and since that time has probably bought more wool than any other individual operator. He will continue his activities in this field, in addition to assuming the duties of his new office."

On May 8 the Boston News carried the following: "Herbert G. Fales, a Vice-President of the International Nickel Company, Inc., has been elected a director of the Company, Robert C. Stanley, President, announces. He fills the vacancy left on the Board by the recent death of James L. Ashley. Born in Roxbury, Mass., Mr. Fales is a graduate of . . . Technology, where he was an instructor for two years,

following service as Ensign in U.S.N.R.F. during the first World War. He first entered the employ of International Nickel in July, 1922, at its Huntington, West Va., Works."

On July 27 the Boston *Herald* carried the announcement of the engagement of Robert Merrill Kitchin, a junior grade lieutenant in the Naval Reserve and son of Donald W. Kitchin, to Sara Elizabeth Buchanan of Simons Island, Ga. — A letter to The Review from H. C. Haskell '20, a commander in the Naval Reserve, enclosed a picture which your Secretary has not seen, taken in a prisoner-of-war camp near Chartres, France, with the statement, "The four villains in the picture discovered that they were all Technology graduates of the last war era." These villains were Commander Henry C. Haskell '20; Commander Lester Wolfe '19; Commander Don Randolph '21, and John Meader '19, a naval air technician. — Your Secretary spent a pleasant evening and had breakfast with Jack Fleckenstein in Detroit on May 18 and 19. On May 29 George McCarten dropped in on his way to Philadelphia and Palmerton, Pa., for Memorial Day. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York 17, N. Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1921

Greetings to you all on the advent of our silver anniversary year! As your Assistant Secretary looks back over almost 25 years of dishing out this sort of stuff (and wondering whether anyone bothers to wade through it), it is not only encouraging but just short of amazing to find out how the stout little band of suffering readers has steadily increased in numbers over the years. Then there's your record in the Alumni Fund, — almost three-quarters of our quota of contributors have given 85 per cent of the assigned amount. We're aiming to make both of these figures go over the top in this year of years. So, if you will boost your ante to the \$15 per capita expected of us, or if you will try out your sales appeal on bringing another '21 man into the fold, your good deed will have accomplished a most worthy result.

During the summer, A. Warren Norton, XV, took over the duties of president of the Alumni Association, to which post he was elected earlier this year. Warrie is also president of Press Wireless, Inc., New York.

Donald B. McGuire, VI, wrote a welcome letter last spring, just too late to be incorporated in our last notes, and then came in to Newark to see us. Father Time has been kind to Don, and he still looks like the kid of 25 years ago. Married four days after our graduation, he has two swell youngsters. Don, Jr., a sergeant in cavalry reconnaissance with Patton's Third Army, has the Bronze Star and has been in at least five major engagements. Janice entered Wheelock College this fall. Don himself claims no glamour but we did locate a couple of places where he burst into print on his pet subject, electric power transmission. As chief engineer of the Rockland Light and Power Company, Middletown, N.Y., he has had the major responsibility for keeping steam and hydro plants turning out the

kilowatts and enjoying the satisfaction of seeing many of his own designs and inventions help maintain the system efficiency during the recent critical years.

Daniel P. Barnard, X, associate research director of the Standard Oil Company of Indiana, has moved from the Whiting laboratories to the Chicago offices in order to co-ordinate the research program more closely with other departments. Recently in Europe on an Air Force project, Dan is specializing in automotive and aircraft developments. Also in the Chicago offices after a special assignment to the office of the Secretary of War, William B. Plummer, X, has doffed the silver oak leaves and resumed charge of Standard's development and patent departments.

Henry C. Haskell '20 has sent in a photograph with the comment: "It was taken in a prisoner-of-war camp near Chartres, France, and the four villains in the picture discovered on that day that they were all M.I.T. graduates of the last war era." Shown besides Commander Haskell are our own Commander Donald W. Randolph, II, and two members of the Class of 1919 — Commander Lester Wolfe and John Meader, naval air technician. Thanks, Henry.

Merrill A. Yountz, V, formerly research chemist with the Drackett Company, Cincinnati, Ohio (and before that, if memory serves correctly, a member of the saxophone sextet of Tech Show), has joined the staff of Battelle Institute, Columbus, Ohio, where he will continue research in organic chemistry. — Lee J. Purnell, VI, associate professor and head of the electrical engineering department of Howard University, Washington, D.C., has contributed an article to the September issue of *Electrical Engineering* entitled "Determination of the Individual Resistances of a Delta Mesh by Measurements Taken at the Junctions." — Jack V. Whipple, II, New York engineering and management consultant, reports that his son has entered Technology this fall.

Harold R. Blomquist, VI, sent us greetings via a mutual friend during a summer trip to New York, and we subsequently had a telephone visit to bridge the many years which have elapsed since the battle of the Charles. Formerly with the New England Power Association in Boston, Harold transferred to the United Electric Railways Company, Providence, R.I., in 1933 and has since been in charge of engineering and research. He has a daughter, Sylvia, who is 15. — Among the electricals, we have recently had contact with Douglas M. Burckett, VI, who is in charge of the electrical division of the Boston and Maine Railroad, Boston. — In Federal's wire and cable plant, James L. Entwistle, VI, head of the Pawtucket, R.I., firm of the same name, comes in for a lot of publicity via the name plates on the many conspicuous insulation testing equipments which proudly announce that Jimmie made them.

Dugald C. Jackson, Jr., VI-A, lieutenant colonel of ordnance at the Frankford Arsenal, Philadelphia, has sent us a most complete series of suggestions and promotional matter for the forthcoming class book. Dugie really dug into the problem in a masterly fashion, which puts us to shame for ever believing we had learned the art of logical and orderly approach to a problem. Saint and your scribe are indebted to Dugie for the considerable aid, and it will be up to

the rest of you fellows to help us out, according to details which will be mailed.

Elliott B. Roberts, I, lieutenant commander of the Coast and Geodetic Survey, has followed up our conversation in Seattle last March with a letter from his new assignment in Washington, D.C., as assistant division chief of the Survey. He says, in part: "I finally reached Washington after a 6,000 mile motor inspection trip through the West and Southwest, inspecting seismological and geomagnetic activities. You'd be surprised how many practical war activities are based on research in these lines. It is quite a change for me to be here after six years at sea in the Aleutians. Since the beginning of the war, I have commanded a survey ship in the western Aleutians, and I'm grateful for a hitch of shore duty, even if it is in hotter weather than I've known for years. I was fortunate enough to have both the inspiration and means to invent and develop certain hydrographic instruments of enough value to be designated with my name and to have become standard equipment in the United States Navy and the British Admiralty. I now see a clear field ahead for work in the field of seismological instruments. The importance is specific because of the growing status of engineering seismology. This brings you up to date except for personal details. The Missus is thrilled with our new house at 18 Wetherill Road, Westmoreland Hills, Washington, D.C., and the daughter, aged 15, is beginning to wonder what college she'll select. As for me, I dabble at writing and find it hard to pass a music store with the latest Shostakovich on display."

Among the summer address changes are: Stuart E. Bradford, I, Raymond Concrete Pile Co., 140 Cedar Street, New York 6, N.Y.; Harold M. Estabrook, II, Fire Association of Philadelphia, 401 Walnut St., Philadelphia, Pa.; Angelo O. Forestorzi, II, 1421 Cadiz St., New Orleans 15, La.; Alfred H. Fletcher, XI, City Health Dept., 125 Worth St., New York 13, N.Y.; Lawrence E. Harmon, Jr., X, 4429 Olney St., San Diego 9, Calif.; Arthur R. Harvey, XV, 101 Kensington Rd., Middletown, Ohio; Jackson W. Kendall, XV, Bekins Van Lines Co., 525 West First South St., Salt Lake City, Utah; William B. McGorum, II, A.C.F. Brill Motors Co., 30 Church St., New York, N.Y.; Rollin F. Officer, XV, Maryland Ave., East Falls Church, Va.; Edward M. Richardson, I, 26 Wisteria St., Salem, Mass.; Douglas Weatherston, II, Standard Oil Company of Texas, 34 Milan Bldg., San Antonio 5, Texas.

Thanksgiving for us connotes not only Victory but your swell support of the Fund, the assurance that we can all meet next June, and last, but far from least, your most welcome letters. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Corporation, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 200 Mount Pleasant Avenue, Newark, N.J.

1922

Even though the war is over, news of our classmates who have been in the service will continue to come in. If you will keep the Secretary posted, perhaps we can have for the next reunion some sort of history of the active war service of men in our Class.

Abraham G. Silverman, XV, whose home is in Lawrence, Mass., has been home on sick leave after about three and one-half years in the Pacific theater of operations. Colonel Silverman went on active duty in August, 1940, in Boston and has since participated in the New Guinea, South Philippine, and Luzon campaigns as chief of supply and of the equipment section. He has been awarded the Legion of Merit and the Distinguished Unit Badge for services with the Papuan forces.

The War Department recently announced that Walter C. Pew, XII, had been awarded the Legion of Merit. Before entering the service, Colonel Pew was general sales manager and a member of the board of directors of the Sun Oil Company. He was in charge of a group of experienced oil experts on General Eisenhower's staff, whose task was to plan the supply of oil and fuels for the Allied invasion of Normandy. Since then he has been located in France, handling problems of the Army's relationship with the civilian affairs of the French Government and people.

Promotions in the business and scientific world have been the order of the day. Harold O. Berry has been named general manager of the Gardner plant of the Florence Stove Company. Donald F. Carpenter was recently elected vice-president and assistant general manager of the Remington Arms Company, Inc. C. H. Greenwalt has been appointed assistant director of the development department of Du Pont, where he will direct activities in which technical considerations predominate. All of these men have been with their respective companies since graduation, and we are all glad to hear of their success and wish them the best of luck in their new assignments.

We regret to report the death of Raymond L. Vaughn, II, of Providence, R.I., on August 29. He was executive secretary of the L. Vaughn Company, lumber dealers, and well known in Masonic circles. Vaughn had been in ill health for about a year, according to the information kindly sent in by Walter M. Saunders. He was grand master of the Grand Lodge of Masons in Rhode Island in 1941. He is survived by his widow and a daughter at Sweetbriar and a son at Kent School. We shall miss Vaughn, who has attended most of our class reunions and other affairs.

The Secretary has not yet had an opportunity to digest the letters and comments that came in after the mailing of the class business directory. Treasurer Vilett reports that exactly \$200 was received in contributions and that although this sum is not sufficient to defray the entire cost of a future edition of the directory, it is a substantial start in this direction. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

1924

Two atomic bombs, the end of the war, and the lack of 1924 notes in The Review have moved various members of the Class to come out of hiding — where the Secretary has also been — and tell us of recent activities.

Bill Robinson, we learn from a recent news release, has been named manager of

the advertising division in General Electric's lamp department, with headquarters at Nela Park. Previously, Bill had been in charge of the department's program of conversion to electronic tube production, and earlier had been district engineer and assistant manager of the South Pacific sales district at Los Angeles, with an interim as supervisor of Hollywood studio lighting.

A letter from Bump Brown encloses a clipping announcing the return of Don Vaughn from military service and his appointment as assistant manager of the engineering and inspection department of the Aetna Life affiliated companies at Hartford. Brownie, who was recently promoted to manager of the Connecticut Valley Power Exchange, also reports seeing George Nash of Central Hudson Gas and Electric Corporation in Poughkeepsie during the summer. Brownie suggests that we have our war-delayed 20th reunion next spring instead of waiting until 1949. Let's hear from the rest of the Class on that question.

Via Anatole Gruher comes word that Bill Correale, a major in the Corps of Engineers, is with the Fifteenth Army Headquarters in Germany and has been awarded the Bronze Star. Wink Quarles, back in civilian garb, is secretary of the Technology Club of New York and has also returned to the McGraw-Hill staff. Greg Shea is associate editor of *Electronic Industries*.

Unquestioned champion of 1924 in the parenthood class is Paul Cardinal, whose spring, 1945, announcement carried news of the arrival of another son, Alan, evening the score at four boys and four girls. Any challengers?

The Secretary had a pleasant luncheon date in Boston with Charley Riva, who had opened an engineering and construction office in the Statler Building, and later saw Bert Donkersley, who for some time has been chief engineer of the industrial division of the Grinnell Company in Providence. That city is now the headquarters of the Secretary, who hopes that members of the Class will get in touch with him either at the Telephone Building or at 116 Nayatt Road, West Barrington, R.I. — FRANCIS A. BARRETT, *General Secretary*, 234 Washington Street, Providence, R.I. GEORGE W. KNIGHT, *Assistant Secretary*, 36 Arden Road, Watertown 72, Mass.

1925

If this makes the November issue, credit should go to the Assistant Secretary, and if it does not, you can blame the Secretary, for the former sent it to the latter on September 6, which should have left ample time to add a few items to the Assistant Secretary's account of the reunion and get it back to Cambridge. Here is the 20th reunion story, as Doc wrote it: "Despite travel conditions I believe we can say the reunion on Friday evening, June 22, was most successful. Only 34 were able to make it, but more than 120 others replied indicating they couldn't make it and expressing regrets. Everyone present was in favor of a bang-up affair five years hence, the consensus being that wives should be included on that occasion.

"Much credit is due Don Jones for making arrangements at the University Club for the evening. Liquid refreshments were available in the dining room, and despite generally poor pickings in the food line

around Boston at the time, everyone seemed well pleased with the lobster, chicken, and fish the Club served us. Tom Price made a long postponed business trip and was thus able to preside in his usual fine manner. Everyone was asked, during the course of the evening, to give a short résumé of his present activities. Chet Trask, a lieutenant colonel, was able to give us some firsthand impressions of the European theater of operations, since he had just returned from overseas, and easily took the prize for coming the longest distance. If our dinner had been 24 hours earlier or later, Frank Corliss would have beaten him, being only shortly back from Santo Tomas in the Philippines.

"Those present were as follows: Course I, Fred Rice; Course II, Myron Doucette (Lt. Col.), Rusty Blair, Edward Hagstrom, Jim Howard, Henry McKenna, Ernie Greenough, Archie Nickerson, Gus Hall, Frank Turnbull, Bob Hodson, Bob Huthsteiner, Ken Proctor, Don Jones, Speed Hopkins; Course III, Gus Marsh, Doc Foster; Course VI, Frank Mulcahy, David Goldman; Course VI-A, Ed Lynch, Eddie Kussmaul; Course IX-B, Tom Price, Dwight Marsh; Course X, James Anderson, Scott Emerson; Course XV, Chet Trask (Lt. Col.), Joe Kaplan, L. T. Gregory, John Hoxie, Mitch Mitchell, Cushing Foss, Jack Dunbar (Lt. Col., now in the Department of Military Science at the Institute), Henry Cunningham.

"Sam Caldwell, VI-A, had every intention of being present but transportation difficulties overtook him en route from Chicago, and he arrived back in Boston too late for the dinner. Business, including a meeting of the Visiting Committee of the M.I.T. Division of Industrial Coöperation brought Bill Steinwedell to Boston on June 22, but he was unable to attend the dinner because of other engagements. In the course of the evening the names of those who had passed on since our last reunion were read, and a moment of silence was called for in their memory. I am enclosing for your records a complete list of deceased members of the Class of 1925 as of June 20, 1945, and also a complete list of those of the Class in the armed services of the U. S. This was available at the dinner and was viewed with considerable interest by all those present.

"Edward Alexander, VI-A, recently dropped in for a few minutes' chat. He has been moved to Binghamton, N.Y. In the news quite extensively of late are releases concerning radar, and you have probably seen mention of the Radiation Laboratory at Technology, as playing an important role in these developments. At least one 1925 man, Frank Gilmore, was hidden away there doing his bit and possibly a plug is in order for myself, for our Division of Industrial Coöperation has carried considerable business responsibility in connection with this operation. Ken Bainbridge, VI-A, was very active in the laboratory early in its history and then disappeared. Possibly you have noticed his name in the news releases regarding the atomic bomb. He was apparently in charge of the detonation of the test bomb last July. I hope you will find occasion to come this way in the near future."

Two letters enclosed by Doc were from Ave Stanton and Herb Taylor, expressing the hope that they could make the reunion

(P. S. They didn't). The third is, unfortunately, the news of the death of a classmate, written by his father, F. H. Miller: "My son, John Amos Miller, was married on May 2, to Margaret Conniff. They left immediately for Denver, where they expected to live. John Amos was taken ill and removed to a hospital on May 30. An emergency operation was performed on June 6, and he died on the morning of June 8 following a heart attack. He was buried in Louisville on June 11." Our sincere condolences to his family, and especially to his bride of but little more than a month.

From the August 14 issue of the *Hartford Courant* comes the information that Donald G. Vaughan, IX-B, has been appointed assistant manager of the engineering and inspection departments of the Aetna Life affiliated companies. The following quotation is from that announcement: "Mr. Vaughan will assist Manager Walter S. Paine in the general administration of the department, giving special attention to engineering field activities and intensifying engineering service. He was born in Springfield, Mass., and graduated from Springfield Technical High School and from . . . Technology in 1925. He is a registered professional engineer in Connecticut. Prominent in conservation activities, Mr. Vaughan is a member of the American Society of Safety Engineers, and is active on committees of the American Standards Association, the National Fire Protection Association, and the National Safety Council. Mr. Vaughan is married, and lives at 132 Maple Avenue, Windsor (Conn.)."

Also at hand is a rather lengthy clipping from the *Boston Globe* of April 28 recounting the experiences of Frank Corliss, his wife and daughter, in a Japanese prison camp in the Philippines. Because of lack of space, this will have to be reserved for next month. — HOLLIS F. WARE, *General Secretary*, Post Office Box 52, Godfrey, Ill. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

1926

The member of our Class who has been most in the public eye in recent months is perhaps Ernest K. Warburton, who landed with advanced American Forces at the Atsugi airfield in Japan. Colonel Warburton has had an extraordinary career in the Army Air Forces, culminating in his command at the Atsugi airport. He has been awarded the Distinguished Flying Cross, has distinguished himself as a test pilot, and has made remarkable recoveries from air accidents. This past spring the Army Air Forces reported how Colonel Warburton had led and participated in a notable rescue of a damaged P-51 Mustang which had landed on a Jap-held island. Warburton also has the remarkable record of having served in every major war theater since Pearl Harbor, having been stationed in England, Africa, Italy, Alaska, Australia, New Guinea, the Netherlands East Indies, and the Philippines, where he commanded a service group of the Fifth Air Force service command.

Robert C. Dean, who was promoted to the rank of colonel last summer, is back at home in Wellesley after having served in four European countries. He was awarded the Bronze Star in the Colmar campaign.

George E. Wells, Jr., a commander in the Navy, was married in August to Lieutenant Frances McCormack of the WAVES. George is a member of the firm of Walsh and Wells, Inc., of St. Louis. — The marriage of Jane E. Leeds, lieutenant (junior grade), United States Naval Reserve, to C. Humphreys Barry took place in New York City, also in August.

A. E. Cameron has been elected president of the Canadian Institute of Mining and Metallurgy. — Charles E. Tonry, who is with the Southwestern Engineering Company in Los Angeles, writes to Professor Locke '96 that he has been busy with his company since 1940 on numerous design and construction projects, all of which had a direct bearing on the war program and for that reason required the entire attention and activity of all individuals concerned with them. His company is primarily engaged in operations connected with the mining industry. Some of the new projects were of considerable size, involving new ideas, new processes, and, because of material shortages, Yankee ingenuity in the substitution of materials. Tonry's role has been one of responsibility in these projects. He has found time, however, to collaborate in the preparation of a valuable brochure giving specifications which have been sought for all sorts of machines and apparatus and even for construction connected with mining, milling, and smelting operations.

Ben Margolin is now associated with the Cambridge firm of Baird Associates, industrial physicists. — Dudley L. Parsons is vice-president of William E. Rudge's Sons, printers in New York. — A. F. Horle visited the Institute in September while on leave from his job in Mexico.

Among those present at the Alumni Dinner last June were the following classmates: Robert T. Dawes, Donald S. Cunningham, Arthur F. Johnson, Flint Taylor, John B. Wilbur, Laurence G. Cumming, Stewart S. Perry, George Warren Smith, and the Secretary. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

Twenty-five members of the Class attended a dinner and get-together at the Technology Club of New York on June 13. This meeting was engineered 100 per cent by Bob Bonnar, who has done the same fine job in many previous years. Jim Lyles was the genial toastmaster. Here follows a partial list of those present, together with their current business activities: Jack Tweeddale, Western Electric Company, radio division; Eldred W. Bemis, Brake Lining Manufacturers Association; Edward E. Mott, Bell Telephone Laboratories; Jim Lyles, First Boston Corp.; D. H. Spitzli, Congoleum-Nairn, Inc., Kearny, N.J.; Bob Bonnar, General Dyestuff Corporation; Glenn D. Jackson, Jr., United States Finishing Company, Sterling, Conn.; Ray Hibbert, Reflexite Corporation, Norwalk, Conn.; Morgan Collins, General Aniline and Film Corporation; L. B. Woolfenden, General Aniline Works, Grasselli, N.J.; G. C. Toone, National Aniline Division; Wheat Hutchison, Du Pont Company; Charles A. Sanborn, Cambridge Instrument Company; Charles J. Davin, Brooklyn Union Gas Company; Bill Welch, Ameri-

can Telephone and Telegraph Corporation; Kenneth Smith, assistant professor of architecture, Columbia University; Eugene A. Chase, attorney; Dan Metzger, Grinnell Company, Inc.; F. T. Kurt, Grumman Aircraft.

Joe Melhado wrote in that he couldn't attend the dinner because of his activities with the War Production Board in Washington. Ernie Dodge sent his regrets from 917 Hurt Building, Atlanta, Ga. Ted Ordman, who was frequently seen at New York meetings, couldn't make it in this year from Richmond, Va.

Ed Damon appeared in New York the other day busily furthering the interests of the Phillips Petroleum Company, for whom he manages the natural gasoline plants. He looked about the same as the rest of us: the same only heavier. Dyce Coburn also turned up in New York with his wife and some friends from Reading, Pa. He was on a short visit, still trying to get seats for *Oklahoma*. Samuel Auchincloss made the local press on August 28 in the following terms: "Col. Samuel Sloan Auchincloss of Darien, Conn., on leave as vice-president of the New York Quotation Co., an affiliate of the New York Stock Exchange, is chief signal officer of the advanced headquarters party which landed at Atsugi Air-drome, 16 miles from Tokyo. Col. Auchincloss wears the Silver Star for his part in establishing and maintaining communications during an attempt by the enemy to gain a foothold in Buna Station, New Guinea, in December 1942. He is the son of the late Mr. and Mrs. Samuel S. Auchincloss of New York City."

The *New York Times* of May 2 disclosed the following concerning Jim Chamberlain: "Mr. and Mrs. Hermann Wunderlich of Tarrytown, N.Y., have announced the engagement of their daughter, Roberta Margaret Julie, to James M. W. Chamberlain, son of Mr. and Mrs. John J. Chamberlain of Akron, Ohio. Miss Wunderlich attended Scarborough School and National Park Seminary in Washington and later was associated with her father in the art firm here of Kennedy & Co., founded by her grandfather shortly after the Civil War. She is a member of Town Hall Club and Sleepy Hollow Country Club. Mr. Chamberlain . . . is president of U. S. Stoneward Company of Akron, Ohio. He is a member of the Portage Country Club of Akron, the Chemists and Union League Clubs in New York."

Another '27 marriage was revealed in the Bridgeport, Conn., *Telegram* of June 30. Mildred Zellar of Nyack, N.Y., was married to Lewis Millar Lucas of Hilltop Road, Black Rock. Mrs. Lucas attended Knox School and Smith College and was a member of the advertising staff of B. Altman and Company. — Lt. Oliver E. Becker, Headquarters 68th Group A.A.C.S. — A.P.O. 565, care of Postmaster, San Francisco, Calif., is working on radar equipment with the Army Airways Communications System. He has been in the service almost three years and hopes soon to return to his home in Sacramento, Calif.

The following press release from Army Headquarters in the United Kingdom will be of interest: "The promotion of Charles C. Smith, 40, Great Oak Farm, Orange, Conn., to the rank of colonel has been announced by this Army Transportation

Corps Port. Colonel Smith is director of port services supervising the activities of Engineer, Signal, Quartermaster and Medical Corps. Each branch renders its particular service to the permanent personnel stationed in Southampton. The co-ordination of all these services is the task of Colonel Smith. A graduate of the Command and General Staff School at Leavenworth, Kansas, Col. Smith activated, trained, and commanded the 140th Ordnance Battalion when that organization was stationed in Mississippi, Texas, and England. With the approach of D-Day, he was detailed as S-3 officer in one of the principal embarkation areas. Before entering the Army, Colonel Smith was an engineer with the General Electric Company in Bridgeport, Conn. His wife, Mrs. Caroline K. Smith, and children, Charles and Cristen, live in Orange."

Maurice Davier was featured in a Johns-Manville publicity release, which we quote in part: "Creation of a new executive position devoted exclusively to planning was made public today by Johns-Manville Corporation with the announcement of the appointment of Maurice Davier as manager of planning. In his new position, Mr. Davier, who will report directly to the president, is believed to be among the first executives in American business to specialize in the management of the planning activities of an industry. In addition to duties in the organization, co-ordination and expediting of all plans relating to Johns-Manville's postwar program, he will provide central administration of a program of company-wide planning which is now being undertaken and will continue to be stressed in the future as a regular part of management activity."

Now for the mailbag, as space will allow: Ike Stephenson has been traveling all over the country, as revealed in the following: "My Wisconsin address (114 Hattie Street, Marinette, Wis.) is merely a mailing address as I move around too rapidly to keep up with changes of address. I am now a full colonel in the Army Air Forces, at present assigned to Fort Worth, Texas, as a special project officer for the Air Technical Service Command. For the past two years I've been on various special projects mostly connected with B-29's. I've been stationed at Wright Field, Washington, D.C., Colorado Springs, and now Fort Worth. I've been to about every state and to most Army airfields at one time or another."

Something new in the way of class correspondence is a letter from Margaret Derby Pinkerton, wife of John M. Pinkerton of 414 W. Princeton Avenue, Orlando, Fla.: "As Pink is overseas in the Pacific theater, I have taken the liberty of not forwarding your letter, for it often takes such a time to reach him. He is a captain in the Engineering Corps and is stationed in the Philippines with the following address: 5251st Engineer Base Depot Group, A.P.O. 75, care of Postmaster, San Francisco, Calif. He has been overseas for nearly 16 months, first in the New Guinea Field, and then in the Philippines. He entered the service in October, 1942, and served at the New York Port of Embarkation, and was later transferred to Fort Belvoir and from there to overseas duty."

Lawrence Whit recently returned to the Rhode Island Public Expenditure Council,

which he organized in 1943. Before this move, he was technical information specialist for the Office of Alien Property Custodian, Office of Patent Administration, which, he says, "amounted to a glorified sales promotion job." — Sid Blandford, in his well-known cryptic fashion, submits the following report on his activities: "Present address — Shaker Heights, Ohio. Present assignment — major, Medical Corps, Plastic Surgery Service, Crile General Hospital, Parma, Ohio. The future — dependent on the value of 119 points."

Percy L. Richardson sent us the following interesting letter: "The lot of a secretary, whether it be male or female, is not always a happy one. This writer has not been a regular contributor to your column, although he has noted that '27 has been rather conspicuous by its absence on several occasions. Perhaps '27 is to be renowned for the great number of the strong silent type, especially the latter. Autobiographically speaking, your writer joined the staff of the Du Pont industrial engineering division in January, 1945, being assigned to the Remington Arms Company plant in Bridgeport for a short period. I am now located in Wilmington, specializing on power contract work, which covers the procurement of the various utility services required by the company. Before my present affiliation, I was employed in the rate engineering department of Ebasco Services, Inc., New York (service organization of the Electric Bond and Share Company). The work here is most interesting and stimulating, and Wilmington and its environs have much to recommend it. Down here in the provinces, the writer has not had the pleasure of crossing the trails of many classmates other than natives. However, a bit of intelligence on others may not be amiss. John Buhler is now with North American Phillips Company in New York. From time to time a letter comes from Puerto Rico, where R. L. Petersen, VI, is on the radio materials engineering staff of the United States Navy and, according to last reports, finding the country very interesting. Fred Harrington, VI-A, is with Western Electric Company in New York. Last word from Jim Snediker was to the effect that he planned to take a brief hop to England and France on a purely business trip; no one goes to Europe otherwise these days unless they can take a few trunk loads of dehydrated hamburgers and other delicacies. Carol E. Osgood, XV, writes faithfully once or twice a year; he is enjoying life in Los Angeles, with Douglas Aircraft Company at the El Segundo plant."

Our showing in the Alumni Fund has been very creditable insofar as amount contributed is concerned. The sum of \$3,200 has been received, which is only \$200 under our quota and more than any other single class except 1921 and 1922. This amount was contributed by 165 class members. The quota for contributors is 275. Write often. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York, N.Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Stevens-Arnold Company, Inc., 22 Elkins Street, South Boston 27, Mass.

1930

Our 15-year reunion, curtailed by travel restrictions and wartime activities, was

held in Cambridge and Boston on Alumni Day, with 16 classmates in attendance. Luncheon, movies of our last reunion at Saybrook in 1940 and of the Tech Circus during our freshman year at the Institute, Class Day, and the Alumni Dinner in the evening were the main items on the program. Those in the gathering were Charlie Abbott, John Blake, "D" DeLorenzo, Howie Gardner, George Gassett, Dave Giller, Deac Goodhue, Enoch Greene, Jack Guinan, Joe Harrington, Ed Kingsley, Ed Mears, Stan Russell, Scotty (VI-A), Hy Stein, and your Secretary. Credit for planning and running the luncheon goes to Scotty and Jack Latham. The latter was unable to be with us because of a very untimely attack of mumps. Reunion activities of our classmates in other cities were unreported as these notes were prepared, but maybe some of the lads are holding out on us!

Eleanor Hull of New York City was the June bride of Robert Poisson. In July, Lauri Lindell was married to Ellen Anderson of Vienna, Me. Our best wishes to Bob and Lindy! — Admiral Halsey recently commended Robert Nelson, a lieutenant commander, for meritorious conduct in the performance of his duties as a member of the hangar deck repair party of an aircraft carrier in action off Okinawa Jima in June. Joe Westell is a senior lieutenant with the Seventh Fleet in the Pacific, after having served as skipper of mine sweepers in the Caribbean and South Atlantic, according to information received from his parents. — Sid Kaye has been working for the past four years with Boston port authorities in keeping food supplies moving to Europe. As a sideline he does pen-and-ink sketches of historical points. Professor Locke '96 writes that Leo O'Neill is now assistant superintendent of the Phosphate Mining Company, Bartow, Fla., after service as principal production specialist at Lima, Peru, for the Federal Emergency Administration.

Professor Horwood '16 has received a letter from Pablo Ignacio de Jesus giving an all too vivid picture of Manila, as follows: "I take advantage of this first chance to write to you after being liberated from three years of Japanese tyranny and oppression. From the papers you must have acquired some idea of what these barbarians did to my people and country, no description of which can do justice to the truth. We look back upon those three years as a dark age when we suffered a complete black-out from civilization, prisoners confined in islands surrounded by vast seas and guarded by the most ruthless and cruel of savages who considered it great fun to torture and shoot, or bayonet for economy's sake, helpless people, including women and children, after systematically looting their food and possessions. I hope that the American people were not misled to believe the Japanese propaganda of 'benevolence' to Filipinos to whom they even gave 'independence,' which in fact, is only one of the characteristic tricks of speaking and publishing one thing when they mean exactly the opposite. To the Filipinos the so-called 'independence,' which was widely propagandized by Japan, meant removing the iron chain from our hands and tying it around our necks. A more despicable and hateful people I have never

seen, but have certainly heard of, in news of the same performance in China. For being liberated from the clutches of these unspeakable beasts we are eternally grateful to America and to the brave and gentlemanly American soldiers.

"Personally, I have suffered somewhat from this war, though luckily not to the extent others have. I came through one of the bombings with only shrapnel wounds, whereas one very near me lost his life. My wife and children are all safe though almost every family I know is in mourning. I evacuated my wife and children from Manila when things were getting hot. My house was burned during the action in Manila, but I was able to save some clothing which my family took with them in leaving Manila. My office in the Institute of Hygiene was destroyed by Japanese blasting and artillery fire, and in it was my whole library with valuable letters and publications. At the beginning of this week I was recalled to my former position in the Institute of Hygiene, which helps me somewhat financially, but there is so little left of this building and of the whole University. We are depending now upon United States aid to supply us the bare needs of equipment, supplies, chemicals, and books with which to begin classes. From the papers you must have heard that more than half of Manila is in rubble and the best half at that, for the Japs knew what to destroy, and what was left of the good buildings they used for their last stand and subsequently destroyed by artillery action. Worse than this, many people lost their lives because a week before the Americans entered the city, the Japs went on a spree of burning and shooting. In some districts of the city they systematically gathered all the men in buildings and churches, first on assurance that they would be more secure in those places, later tying them, locking the doors, and finally throwing hand grenades and explosives into their midst. Those who tried to escape were machine-gunned. During that horrible week, anyone found in the streets was shot; people moving from their burning houses were shot; those hiding in vacant lots were machine-gunned by the Japs. It was simply a carnage of helpless civilians with no apparent military purpose but to exact vengeance on people who defied and hate them as cruel, savage aggressors."

Official recognition must be given to the excellent showing of 1930 in the last available figures (as of August 31) for the 1945-1946 Alumni Fund. As compared with our standing a year ago at the same time, the number of contributors is only 1 per cent greater, but the amount contributed is 42 per cent higher. We are neck and neck with the two classes we are out to beat (1928 and 1933), and the ball is now in the hands of the 1930 men who gave last year and previous years, but who haven't done so as yet this time; and should these notes fall within sight of any '30 men (or women) who never have contributed before, let's hope the inference will be obvious. Put 1930 on top! — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass.

1932

It is certainly grand to be able to start this volume of class notes with the knowl-

edge that we are now in that period, "after the war," to which we have all looked forward. As a Class we are doing better in the Alumni Fund, having subscribed 55 per cent of our quota of \$3,300 by the end of August. We can do much better if you will write that check tonight.

Rolf Eliassen, a major, writes from Europe as follows: "Two months ago I was abruptly uprooted from Salt Lake City and sent to France. I am now stationed at the new American University which has recently been established in Biarritz for the G.I.'s who are waiting to return home. I am in charge of the department of civil and sanitary engineering and am teaching courses in sanitary engineering. We are all studying, but also having a marvelous time at this swanky seaside resort in the southwestern corner of France. I have made some interesting trips into the Pyrenees and the beautiful countryside east of Biarritz."

Paul A. Robert was recently promoted from the rank of first lieutenant to that of captain and is stationed in the Rochester Ordnance District. Before entering active service in August, 1942, he was a civilian employee in charge of the personnel branch of the same Ordnance District. Before that, he was employed by the International Business Machines Corporation in Endicott, N.Y. — John Finnerty, a major, was appointed last July prisoner-of-war division director of the Third Service Command internal security division. — Charles Chapman, formerly with the Minerals Separation North American Corporation, may now be addressed at Post Office Box 71, Walpole, Mass., where he is centrifugal engineer for the Bird Machine Company. — Al Dietz is heading a program of fundamental research on plastics at the Institute. This program is being sponsored by the Plastics Materials Manufacturers Association. Your Secretary has participated in several meetings where this program was initiated.

If any of you care to bring your classmates up to date on your doings and let them know where to write you, this column is the place to do it, and we trust you will avail yourselves of the opportunity. — CLARENCE M. CHASE, JR., *General Secretary*, 1207 West 7th Street, Plainfield, N.J. *Assistant Secretaries*: CARROLL L. WILSON, 1530 P Street, Northwest, Washington, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1933

Just a few lines to remind you folks that we are still in business and always looking for news. We had a letter from Bill Pleasants: "I ran into Bill Conant in Nashville the other day, and he has been with Du Pont about 10 years. He has just returned to Old Hickory Rayon after several years in war plants including Gopher, S.D., Pasco, Wash., and Oklahoma. He is in industrial engineering work. I have been with Du Pont since 1940, working in government-owned explosives plants. I had charge of construction of the power houses in Indiana, then went to Alabama on operations. I spent several years there as power superintendent and was then made general superintendent. Two weeks ago, I was transferred back to Indiana as power superintendent. That is the extent of my story and

knowledge of my classmates, except for Dick Morse and Roger Congdon. The three of us had a swell get-together in Boston in May, 1944, when I was up there on my vacation. Dick really knows how to entertain!" . . . Many thanks, Bill, we appreciate your letter.

Much of the news that has come in during the summer months has a military tinge, which is a good indication that the men in '33 have made real contributions in the active theaters of war. John King has written that he is back in this country, stationed at the North Atlantic Engineering Division, 270 Broadway, New York City. John writes in part: "Before arriving here early this month, I spent some six months at Moore General Hospital in North Carolina, recovering from a type of jungle rot on the legs contracted in the Philippines (Leyte Island) last winter (only it was the hot rainy season out there). I went in on A-day with the 96th Division and lasted for the Leyte Island campaign."

Ray Kenney, an Army captain, called early in the summer while he was here on business. Ray is in the Air Forces stationed at Langley Field with the N.A.C.A. Herb Grier is around the Institute regularly and has made a major contribution in the art of using high-speed photography for military purposes. Herb has worked closely with Professor Edgerton for many years. Cy Hapgood, a lieutenant commander, visits Cambridge periodically in his official capacity with the Bureau of Ordnance, where he is concerned with patent matters, among other things. Cy reports that Gene Cary is with the Bureau of Aeronautics.

Oscar Lorentzen has recently come back to the Institute to work on an important continuing project sponsored by one of the services. Oscar has lately been with General Electric and before that worked with American Bosch. — News has been received that Major Dominic J. Chiminiello has been made executive officer of the Boston Chemical Warfare Procurement District. Before entering the service, Major Chiminiello was manager of Fenwal, Inc., in Ashland. — Marine Colonel William G. Manly, a colonel in the Marines who was graduated from the Naval Academy before coming to the Institute, has been named commanding officer of a Marine Air Support Group at El Toro, Santa Ana, Calif. His group was one of the first all-Marine Carrier units to be formed. During 1943, Colonel Manly was chief of staff for Marine Air Wings, Pacific. — John R. Wiley has been promoted to the rank of lieutenant colonel in the Army Air Corps and is currently on duty in the Hawaiian Islands as transport operations officer for the Pacific division of the Air Transport Command. — Lewis N. Miller has recently been assigned as director of administration and station services at the Great Bend Army Air Field in Kansas. This assignment follows a tour of duty in the Caribbean theater of operations. Major Miller was associated with the Miller Manufacturing Company in his native city of Richmond, Va., for several years before entering the service. — Lieutenant Louis P. Balboni, USNR, has been assigned to temporary duty at the Atlantic Fleet's Minecraft Training Center at Little Creek, Va., after almost a year's duty in the European theater. Louis, as many of you know, was in the trucking

business in Norwood before joining the Navy.

Benjamin Olken was cited in *Newsweek* for his ingenious method of converting surplus army gas masks into a number of different and useful household gadgets. Edwin R. Gilliland received the Leo Hendrik Baekeland award in recognition of his contribution in the synthetic rubber program. Ed served as executive officer under rubber director Dewey. Recently Ed became deputy dean of engineering at the Institute, and your Assistant Secretary has had an opportunity to work rather closely with him on many of the major administrative problems.

We extend our congratulations to the following members of '33 who have been married in the last few months: T. Gorman Byrne, a lieutenant commander in the Coast Guard, and Maurica Marie Lloyd of New York; Ernest Butkus and Priscilla Hearne of Medford; Alanson Gray, Jr., and Gloria O'Brien on May 7 in Orlando, Fla., where Major Gray has been on temporary duty; Ferdinand M. Johnson, an Army captain, and Alice B. Done on August 18 at Fort Sill, Okla.; and Leighton R. Rickards, a Navy lieutenant at present on duty with the Naval Air Transport Service at Oakland, Calif., and Theo B. Pollock of Memphis, Tenn., on August 28 at Salt Lake City. — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y., ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1934

It is with deep regret that we announce the passing of Carl P. Stratton. He died in East Helena, Mont., on July 6 from peritonitis following an abdominal operation. His untimely death is much to be regretted. He was doing a fine job with the American Smelting and Refining Company as assistant superintendent and was advancing rapidly. Very active in mining circles, Carl was a charter member and former president of the Last Chance Gulch Mining Association. He leaves behind his wife, Virginia Campbell, and two sons, Alan and Bradley Stratton.

Phil Goodwin recently received a promotion from the rank of lieutenant commander to that of commander. He is officer in charge of the assembly and repair department at the Ottumwa, Iowa, Naval Air Station, one of the station's largest units. Phil was indoctrinated at M.I.T. and was then ordered to the Naval Air Station at New Orleans, serving first as assistant assembly and repair officer and then as officer in charge of the assembly and repair department. He reported at Ottumwa in April, 1944. — R. C. Gunness has been raised from the rank of assistant director to that of associate director of research and development for the Standard Oil Company of Indiana. After receiving a doctor's degree from the Institute in 1936, Dr. Gunness spent three years on the faculty as director of the Boston station in the School of Chemical Engineering Practice before joining Indiana's research staff. — Major H. A. Fidler of Cambridge, who is a production area engineer, was recently given a commendation from Colonel Kenneth D. Nichols for his work on the atomic bomb.

Father Hahn, who is a Maryknoll missionary, has been assigned to survey the jungles of northern Bolivia for the purpose of setting up an air line to serve the missions. As many of you remember, Joe is a former designer of airplanes and dirigibles and is a licensed pilot. He won a fellowship to the Guggenheim Airship Institute. He is the only priest to be a member of the American Institute of Aeronautical Sciences. At present he is teaching at the Maryknoll Apostolic College near Scranton, Pa.

Rad Edmonds has finally taken the plunge. He was married to Mrs. Barbara Jaquith Peabody, daughter of William H. Jaquith of New Weston, N.J. We are sorry to say the wedding date was omitted. — Oleg Devorn has also marched in time to the wedding bells. He was married on June 16 to Galina Mategorin, daughter of Theodore Mategorin of Detroit, Mich. The wedding took place in the St. Nicholas Russian Orthodox Church in Bridgeport, Conn. Oleg is an engineer for the Sikorsky Aircraft division of United Aircraft Corporation.

The rest of these notes were sent by our Assistant Secretary, Bob Becker, from Drammen, Norway, on August 3.

A letter from Bob Moody's father, together with a clipping from the *Mamaroneck, N.Y., Times*, informs us that Bob is now a major and is at the head of an Ordnance vehicle assembly and storage section in France. After having set up six plants in which some 140,000 vehicles were assembled for the campaign against Germany, Bob is now busying himself with getting all worth-while equipment off to the more active theaters of the war. Recently Bob was one of the 146 American officers who received the Croix de Guerre in Paris for "exceptional service during the liberation of France." Bob has also won for himself the Bronze Star, together with an Oak Leaf Cluster, which represents a second award of the same decoration.

The remainder of my contribution concerns my own wanderings over much of Europe since I last brought you up to date almost a year ago. Early in January, the First Special Service Force saw the handwriting on the wall and disbanded in the same way that all the other special combat units of the Army had done. Our Canadians were all returned to the Canadian Army, and a few of the original American members were transferred to the 82d and the 101st Airborne divisions. For what was left of us, the blow was a hard one. We formed the nucleus of what was to become the 474th Infantry Regiment (Sep), and after gaining some 300 fresh-from-home reinforcements and the 99th Battalion, we were ready to roll. The 99th, incidentally, was made up entirely of Norwegian-Americans; these, like the old force, were winter troops whose one-time mission was to have led them to Norway. Back in January that was a dead giveaway, and we soon found out that our training on the Normandy peninsula was merely a waiting period before shoving off to chase Jerry from the land of the midnight sun. The time wasn't ripe, so the Army handed us another mission of a sort that was both new and experimental. We became a force that protected the rear of the Third Army on its mad dash across Germany to Austria by cleaning out pockets and smoking out

SS men, Gestapo agents, and Nazi Party leaders. To do this effectively, we parked the rubber soles of our boots over the rubber tires of jeeps and trucks. Whereas the infantry company is allotted only two jeeps, our company transportation reached these staggering totals: seven jeeps, five with trailers; four $\frac{3}{4}$ -ton weapons carriers; six $2\frac{1}{2}$ -ton trucks, two with one-ton trailers; and two armored scout cars mounting 37-millimeter guns. Given a sector of perhaps 64 square miles, we were able to set up road blocks, send patrols through wooded areas, and to clean up all the towns within the sector in two or three days. Worked on a regimental scale, we routed out many a German who thought he had eluded capture.

V-E Day found us near Regensburg on the Danube (it was as muddy as the Rhine on the two times I crossed it). The Army had observed our methods closely and was now ready to turn the job over to other units. Meanwhile, we hurried back across Germany and France to Le Havre, where we went aboard a fleet of 13 landing ships for tanks and set sail for Norway. After more than two years, we finally set foot in the country in which we were to have landed by parachute during the winter of 1942. At that time our mission was to have been to play havoc with Norwegian hydro-electric power stations and industrial plants, thereby preventing their use by the Germans, and then make a break for Norway. After touring a little of the country for the past two months, I'm rather glad we arrived in the spring of 1945 rather than during the winter of 1942.

The country, however, is beautiful. We are stationed in one of the many former German camps near Drammen. While the Norwegian Home Guard and the rapidly expanding Norwegian Army is doing the major part of the work in collecting and processing the 400,000 Germans in the country, we are checking and supervising their efforts. And while all this goes on, we have time for fun and play. In Oslo (we are less than an hour's ride from the capital) the Army has done everything possible to make the soldiers' stay a pleasant one. There are two notable firsts: soldiers may bring girls to the Red Cross clubs and to Army-operated beer gardens and clubs; officers and enlisted men are given a weekly liquor ration consisting of cognac, *eau de vie*, champagne, and wine which was found in giant warehouses taken over from the Germans. Inasmuch as all these bottled goods originally came from France, my guess would be that this is Lend-Lease in reverse.

It isn't necessary to ask a man the shade of his date's hair because 95 per cent of them are blonde. Language is no difficulty here because of the fact that the study of English is required in both the elementary and the high schools. Our slang stumps the Norwegians, but they are eager to learn and to use it. We have had to accustom ourselves to the Norwegian mode of living. During the summer the sun rises and sets in almost the same spot, and it never gets dark. The Norwegians must be sun worshippers in that they never seem to go to bed in the long summer days. Presumably they make up this time during the long winter nights. Hordes of children are to be seen everywhere.

Although never faced with the war being fought on their own soil or with the bombings the English lived through, the Norwegians suffered under the Germans and are truly grateful for the victory won by the Allies. They have shown this in their friendliness and their hospitality. Invitations have been extended for fishing trips, for sailing trips, for swimming, and even for monthlong vacations either at the shore or in the mountains. The Norwegian Welfare Committee has made available sight-seeing tours and tickets to shows. The University has made available field trips for those interested in forestry and agriculture and has thrown open its library to us. We here in Norway, in the best Army slang, "have it made"! — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, 169-49 24th Avenue, Flushing, N.Y.

1937

We doubt very much that the atomic age, which is promised us for the future, will result in any earth-shaking change in the class notes, at least for a few years to come. At the present writing, we are still driving old-fashioned automobiles which burn gasoline, riding old-fashioned trains run by electricity or steam, and trying to figure out what has become of the other 98 per cent of the Class. We do find, however, that we stand very high in the 1945-1946 Alumni Fund, having already reached 72 per cent of our quota of contributors and 75 per cent of our dollar quota, which gives us the best overall standing of any class since 1917. Of course, that is only as we figure it. If any members of the classes of '21, '27, '40, '41, '42, or '43 happen to read this, there will be considerable mumbo jumbo about their exceeding our dollar quota percentage.

Incidentally, if any of you fellows have missed seeing the Alumni Pool, you certainly have a sight in store for you. When we were last there, some admiral was instructing would-be ensigns in the fine art of splashing one's way from one end of the pool to the other. Owing to certain rules which had been set down for "security reasons," we were unable to natate and have yet to enjoy that pleasure. — In other lines of endeavor there are several items of progress. Arthur Hunt gave an interesting discussion of the "Advances in Aircraft Tooling Resulting from the War" before the members of the Bridgeport, Conn., branch of the American Society of Tool Engineers. At the time, he was with Chance Vought as tool research engineer.

Richard E. Stoiber is on leave from his post as assistant professor of geology at Dartmouth to act as assistant to the director of the Long Branch signal laboratory of the Army Signal Corps. This laboratory is responsible for the research and development work on quartz crystal units for the Signal Corps, the crystals being used for controlling frequency in tactical and other communications equipment. Harry Goodwin, who is a major in the Ordnance section of the South Pacific Base Command, wrote on August 26 that he had been in the Army for more than four and a half years and was hoping that before long he might be discharged so as to get back into professional work in the field of metallurgy.

His record indicates that in February, 1941, he was stationed at Aberdeen Proving Ground, training draftees to be ordnance technicians. He continued at Aberdeen until the early part of 1944, having been gradually promoted from the rank of second lieutenant to that of major. His next moves were for a short period at New Orleans and another at Camp Beale, Calif., after which he was sent overseas. His first overseas assignment was as ordnance officer of Espiritu Santo Island Command, where he was in charge of all ordnance on the island. After almost a year there, he was stationed at New Caledonia as ordnance maintenance officer in charge of all armament and motor vehicle maintenance on the island. He has had grand executive experience, especially in handling men, at times having had upwards of one thousand under his supervision. While at Aberdeen, one of his jobs for more than a year was to be in charge of the small arms training section with direct supervision of the staff of 96 instructors and 750 students.

Bob Fischel, who is presently located at the Dover, Del., Army Air Field on special assignment from Wright Field, is now a lieutenant colonel. Bob is quite anxious to get back into civilian life and has several things lined up as possibilities for that day. — James Newman, who is stationed at Wright Field as assistant to the chief of the production section's communications sub-section, has been promoted to major. Jim has been in the Army since June, 1942. — We also note that Blake Loring received his M.A. degree in education from the George Washington University, Washington, D.C., on May 30. — Norm Robbins is chief of structures at the Fort Worth branch of Consolidated-Vultee. He expects to come East on his first vacation since 1940 or 1941, during the first part of October, which, by the time you read this, will be a month or so ago.

Dudley Swain and Phyllis Bothner of East Orange, N.J., have announced their engagement. — Charles Kahn, Jr., a lieutenant in the Navy, was married to Estella Huni in the Mandarin Room of the Savoy-Plaza in New York City. Major Ralph Forster of the British Embassy escorted the bride, who was attended by Mrs. Robert Johnson and Mrs. Norman Gerry. Joseph Kahn, cousin of the bridegroom, was best man. Mrs. Kahn studied abroad and was graduated from the Tobias Matthay Piano-forte School in London. Her father was for many years director of the New Haven School of Music. The bride, a granddaughter of the late Professor and Mrs. Christian Merica of Chicago, is a sister of Addison Frederick Huni of Newton, Mass. Lieutenant Kahn served for 20 months in the Mediterranean theater of war and was then on leave from the Pacific, where he took part in the invasion of the Philippines. — If memory serves us correctly, we believe that Phil Dreissigacker, who is now a major stationed at Camp Gordon in Georgia, was married to Ruth Wilson of Mamaroneck, N.Y., sometime this summer. — Montgomery Osborne, who is now a lieutenant colonel and we assume stationed in Washington, was married on August 7 to Dudley Gregory of Washington. Dorothea Stevens, cousin of the bride, was maid of honor, and Maury Osborne was best man. Ushers were Colonel Thomas

G. Early, AUS, Lieutenant Sidney Lee, USNR, Robert C. Stevens, and Richard J. Wheelock.

This is Phil Peters reporting from Cambridge: Lieutenant (Junior Grade) Peters has been stationed at the Radiation Laboratory right in the shadow of the M.I.T. dome for more than a year now, doing liaison work between the Navy and the lab and responsible for introducing to the field certain of the gadgets developed by the lab. This latter function has taken him on two trips to the Caribbean and two to the Pacific within the past 10 months, plus innumerable meanderings to quiet spots like Washington.

There haven't been too many men from our Class who have crossed his path during these misadventures, but there are a few items which may be of interest: D. E. Kerr is a group leader in this laboratory, has the imposing title of "Doctor" before his name, and has recently returned from special work for the lab at Pearl Harbor and in the Philippines. Others here include Al Bagg, who has been a staff member since early in the lab's existence, went to the European theater of operations to help with field problems relative to radar equipment developed here, and presently is in the Pacific, where he's been doing more of the same; Herman Brettman, also a junior grade lieutenant, who's been doing liaison work for the Navy at the Radiation Laboratory for some nine months; Phil Jacobs, an associate group leader, and Dave Summerfield, a staff member, both in the component engineering group.

Ed Edwards, VI-A, has been at the Institute working with Gordon Brown '31 on synchros. Rumor has it that Bill Arnold is an army major stationed at Watson Laboratory, Red Bank, N.J. Ed Hobson is a major in the Quartermaster General's office in Washington. The last time yours truly was down there, Ed's office reported that he was "still out of the country" on a trip, but expected back any day. Ed remains a very eligible and vulnerable bachelor.

The Boston newspapers carried a brief note recently that Joseph Smedile, a lieutenant colonel, was on his way to Japan. I understand that Joe's been in the Pacific for some time; so he'll not have too far to go to undertake his new duties. This spring, in company with Brent Lowe '36, who was best man, I served as an usher in the wedding of Art Hunt to Harriet Spencer of Ansonia. The proverbial bachelor finally fell, but, having met his bride, I can understand why. I've seen quite a bit of Brent Lowe, incidentally; he's Lieutenant Lowe of the Naval Reserve, stationed in Washington, married to a bewitching girl (ex-wave) called Corky, and not too far removed from the state of passing out cigars as a proud father.

When peace hit us on August 14, I was at Pearl Harbor and celebrated the occasion at Waikiki Beach with Dave Bartlett '39, a junior grade lieutenant, erstwhile President of the Keener Oil and Gas Company, but currently assistant first lieutenant aboard a CVE. We had quite a time, as those who know Dave can well imagine. Coming back to Boston, I finally figured in a plane crash after traveling over 200,000 air miles in civilian life and in the Navy. Our DC-3 was pretty well ruined in a crash

landing in a farmer's field in Texas, but fortunately a few bruises were the extent of my injuries. Those seconds between when you know what's going to happen and when it does surely seem like years.

Here's hoping that those of you who haven't yet gotten on the Alumni Fund band wagon this year will now come aboard. We are doing fairly well with 72 per cent of our contributor quota and 75 per cent of our dollar quota, but we'll be far behind at the end unless many more of our esteemed brethren take pen in hand. Also, let's have some more news for this column. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. PHILIP H. PETERS, *Assistant Secretary*, 159 Glen Road, Wellesley Farms 82, Mass.

1939

Mrs. Joe Donovan tops the news this month with the arrival of little Gail on July 20.

An announcement informs us of the marriage of Lynn Campbell Fearn of Ancon, Canal Zone, to Major Nick Carr. And Lieutenant Harlow Reed was married to Jacqueline Smyth of New York City, some time ago (no date available). The *Times* goes on to say that they will live in Boston, where Harlow will complete his training at the civil affairs training school at Harvard.

We were interested to note that the Mme. Elizabeth Shoumatoff who was sketching the late President Roosevelt's portrait when he was fatally stricken is the mother of Nick Shoumatoff, a junior grade lieutenant. Madame Shoumatoff had previously painted a small portrait of Mr. Roosevelt, which now hangs in the White House. Nick, incidentally, is married to the former Nina Adamovitch of Baltimore.

Dick Leghorn, a lieutenant colonel, recently home on leave, has been with the American photoreconnaissance in Europe. Formerly, his group averaged half a million prints a month. Dick has described his closest call, when the "bulge" was being closed, as follows: "I was flying at low altitude in an unarmed P-39 when they got me. The plane had 58 holes, a knocked-out engine, and a cockpit full of smoke, but we made it." Sully's group was awarded a unit citation, and he, himself, wears the Distinguished Flying Cross, the Silver Star, the Soldier's Medal, the Air Medal with seven clusters, a European Theater of Operations ribbon with six campaign stars, and the French Croix de Guerre with palm.

A news release from the General Electric Company reveals some of the work of George Poulsen and Harry Mason: "New types of high-voltage modulators, vital components of many radar and electronic devices, are being designed by George G. Poulsen, and Harry J. Mason, engineers in the power transformer engineering department of the General Electric Company's Pittsfield, Mass., plant. Their work, which entails not only supervision of the designing of the complete modulator unit but also the ironing out of bugs in the finished circuit, is no small job. New types of modulators are constantly in demand for newly developed, and often highly secret, war equipment. The modulator, and the circuits which comprise the complete unit, is highly essential for the operation of many types of radar equipment recently in use on

Pacific battle fronts. Since their work covers a field which is still in the early stages of development, and since the modulators they help produce have been created especially for new types of electronic war equipment, they encounter many problems of design which normally would not arise. The modulators must conform to exacting requirements of size, weight, and strength set by Army-Navy War Standards. They must pass tests of both electrical and mechanical nature and be able to withstand shock, vibration, and extremely adverse climatic conditions." George and Harry worked for General Electric on the company's co-operative course for a year before graduation, and later entered the high voltage engineering test laboratory.

A Boston *Traveler* clipping, under the heading of "Gracious Ladies," gives us an idea of the activities of one of our coeds. To quote: "For every one worried by the current meat and poultry shortage and the problem of stretching meagre red points, here's a silver lining in the story of Domina Eberle Spencer, Ph.D., youthful assistant professor of Physics at Tufts College. . . . Dr. Spencer has a streamlined brain and has never eaten meat, chicken or fish. Moreover, her sister, who's a senior statistician in the Department of Commerce, Washington, D.C., and a Ph.D. also, has likewise never eaten meat and never went to school until she entered college! . . . [Domina] didn't enter school until she was 12 years old, for her mother believed that children could learn more through private tutors than from their parents. She was graduated from the Friends Select School, where she was urged by her instructors to make a career of art, in which she excelled; but decided to enter the field of science. Too young at the time to enter college, she studied privately, and then entered M.I.T., completed the regular four-year course in two years and received her B.S. degree, majoring in physics. Thereafter, at the same institute, she received her M.S. in mathematics, and her Ph.D. with a major in mathematics and a minor in electrical engineering. Simultaneously (and according to her mother, with whom she lives in Cambridge) she collaborated with Prof. Parry Moon of M.I.T. on papers dealing with illuminating engineering, color, and tensore. . . . She began her career as an assistant professor of physics at the American University, Washington, D.C., whence she came to her present post. . . . Because she thinks Christianity and war are incompatible, she joined the American Friends Society and is a member of the Cambridge Friends Meeting. . . . Murder mysteries are her major aversion, and she cannot understand why people should so relish stories dealing with the taking of life. . . . A boatswain in the M.I.T. Nautical Association, sailing is her favorite summer diversion, and skating her winter one. . . . Fond of good music, she plays the piano and in the past mastered the violin, cello, and flute, among other instruments."

From a Marine Corps Air Station press release we learn that John F. Allen, a marine second lieutenant, has reported for duty with the Ninth Marine Aircraft Wing at the Marine Corps Air Station at Cherry Point, N.C. Lieutenant Allen was commissioned on February 14, 1944. His wife,

Ruth B. Allen, is a lieutenant stationed with the Women's Army Corps at Birmingham, Ala. — STUART PAIGE, *General Secretary*, 88 Van Giesen Street, Richland, Wash. ROBERT C. CASSELMAN, *Assistant Secretary*, 271 Cypress Street, Newton Center 59, Mass.

1940

At last direct word has been received from our Class President, H. W. Farrell, from Mukden, Manchuria. Hap mailed a post card saying that he expected soon to be on his way home; and no doubt by the time these notes are in print, he will be in these United States once again.

Robert S. Hess, a lieutenant in the Naval Reserve, has been awarded the Presidential Unit Citation for participation in antisubmarine activities aboard the U.S.S. *Belknap*. — Asher B. Robbins, Jr., a colonel, has been awarded the Bronze Star for meritorious achievement in the performance of service as staff ordnance officer with the Army Air Forces in the Mediterranean theater of operations. — Donald W. Ross received his promotion to the rank of major last spring. Don has been on active duty since June, 1941, having been sent for 15 months to Iceland, whence he returned to the United States for a year, before being sent to France in November, 1944. — Harry Bushloff, a major, has been with the outgoing property branch of the Boston Quartermaster Corps. — David L. Mowrer, Jr., an Army captain, has been with the 41st Engineer Regiment and writes that his three years over there has been a long time and that he hopes the points are in his favor. — Samuel W. Stewart is a project engineer in the research laboratories of Sperry Gyroscope Company. — Alfred E. Castle, a captain, writes that he finished the Army Air Forces Engineering School in Dayton last spring along with Paul Butman, a major. — James H. Moore, a Navy lieutenant, was, when we heard from him, in Salina, Kansas, with the First Photo Reconnaissance Squadron. He speaks of having run into Paul Reynolds, a Navy lieutenant, in Times Square last April. Malcolm C. Allen was aboard the U.S.S. *Kilty* in the Pacific when we last heard from him. Before receiving his commission in 1942, Lieutenant Allen was with the American Can Company. — Harold Wallace, a lieutenant, transferred from anti-aircraft to infantry early last spring and has been working for "a man named Stilwell," with whom, he adds, there are a few obstacles to direct contact. — We understand that J. H. Greenberg, who is a metallurgical engineer with A. J. Boynton and Company of Chicago, is working on a book to be called "Heat Treatment and Metallurgy." — Eleanor A. Miller is a first grade teacher in the Reading, Mass., public schools. — Albert W. Schlechten is head of the department of mining and engineering at Oregon State College and at present is on leave of absence with the United States Bureau of Mines.

On June 2 the former Jacobina Bjornsdottir and Captain Fred Lange were married at his home at Jackman, Maine. The bride was a native of Iceland, where Fred (then a Signal Corps lieutenant) was stationed for nearly two years. Since that time Fred has been in charge of a signal repair company in France, Luxembourg, and Ger-

many. — Mr. and Mrs. George F. Waters have announced the marriage of their daughter, Janet Waters McCune, to Lieutenant T. F. Creamer on September 8. — Jane Elizabeth Ruth was married in July to Lawrence W. Carter. Charles S. Godfrey, an Army captain, and Miriam Lafferty were married last spring. We have also received word of the engagements of Betsey Rodgers Stoddard to William Vandersteel, a lieutenant in the Army Air Forces, of Sybil Pilshaw to Richard Edward Gladstone, a private in the Army, of Catherine A. Sanders to Frank E. Plumley, also a private in the Army, of Mary Louise Sullivan to Frank E. Bothwell, and of Elva May Brain to Charles Edo Kip. A card from Lieutenant and Mrs. Harold N. Miller brought word of the birth of a daughter, Edith Marion, in the early summer. Word has also been received that a son, Randolph Phillips, was born last February to David M. Huber and the former Marilyn B. Phillips of Somers, Conn. David, Marilyn, and Randy are now living in Wilbraham, Mass.

Al Gutttag has written Tom Creamer the information below. We greatly appreciate his sending this in and hope he will continue in the good work. His contribution runs as follows: "Arne Arch is in Europe and was expecting to go to the East but probably didn't because of the end of the war. Massimo Baer received his S.B. from Technology this June. Maurice Baer '37 is still working in the Electrical Engineering Department at the Institute and attended the reunion. Dick Babish was married in June to Josita Dolan and was working in the Radiation Lab. Robert Bonnett is working for Carolina Industrial Plastics. John Burr is at Northwestern University and is married, his wife's name being Irma. Margaret Dienes is still working for Professor Hackett at the Sugar Research Foundation in New York. Alfred Green is working for the Naugatuck Chemical Company. Milton Green is in the Marines. I last heard from him on Okinawa, when he was having a pretty lively time. Jane Hastings is with General Electric in Pittsfield, Mass. Dr. Ingersoll is with Du Pont in Wilmington. Leon Keches is married and has a daughter Rhea, born April 13; Leon was at the reunion. Dr. King is working for Corning Glass Company. Sam Omansky is still in the liquor business as a chemist for Royal Liquor Company, which is a different outfit from the one he was with formerly. Leo Rainard has recently changed jobs. He is now with the Institute of Textile Technology in Charlottesville, Va. Rapoport, also, has switched jobs. He is now at the National Institute of Health in Bethesda and was married in June to Sonya Goldberg. I hear that Conrad Schuerch is now out of the Army and working for some private outfit but know no more. Manning Smith has an address at Oak Ridge, Tenn., which probably means he was connected with work on the atomic bomb." Al closes his letter by saying that he expects soon to be back in Washington with the Patent Office, although for the present his address is still 3216 Patterson Avenue, Richmond 21, Va.

The following news has been received by Tom Creamer in reply to his Alumni Fund Letters. Erl Helland writes that he has been land-based for a number of months at various Pacific naval stations but is

finally aboard a ship that is to be home for some time to come. The last word from Don Ross is that he was continuing to serve as aide-de-camp to a major general in Paris at the headquarters of the United States Army in the European theater of operations. George Carnrick, who was honorably discharged last March after 26 months of foreign service, including three battles, is now working as a chemist at the Sierra Metals Company, Santa Fe, N.M. He reports seeing Captain Harry Hawes last March at West Point, where he is serving as an instructor. Last January he saw Major Beano Goodman in London shortly before leaving and Leo Sullivan in Paris just before leaving there. In New York, he ran into Ray Krieger and Bob Grosselinger. Nick Pickard is a captain in the Atlantic Transport Group of the Royal Air Force. He reported that he met Major Rebori '39 with his wife and baby in Dayton and that he also saw George Krebs '39 in Kansas City, where he is an assistant chief test pilot for North American and will soon be flying the *Shooting Star*.

George Rosenfeld is a lieutenant in the Coast Guard, at present stationed at the Cornell University Medical College, 1300 York Avenue, New York City. Clem Burnap, also a lieutenant in the Navy, is doing hull repair and conversion work in the Ship Superintendent's Office, Navy Yard, Navy 123, Fleet Post Office, San Francisco. He reports having seen several classmates who were passing through. Frank Libman is an engineer for Congoleum-Nairn, Inc., at Cedarhurst, Md., where he has been working on Navy rockets. He urges any Technology men living in or near Baltimore to get in touch with him, as he would like very much to see them. His home address is 18 New Windsor Road, Westminster, Md. Dick Brown, now a lieutenant, junior grade, in the Navy like many other classmates, hopes soon to be a civilian, first class, and back with American Can Company. The last word from Henry Burr, a major in the Army, was that he was at that time in Germany with the 19th Tactical Air Command and had previously been in England, France, Belgium, Luxembourg, and Holland, and among other things, was awarded a Bronze Star for his work in radar. (We hope that Henry is now back in the United States after his long tour of duty overseas.) John Klock, when last heard from, was a junior grade lieutenant stationed at the Naval Air Station, Corpus Christi, Texas, but expected at that time to be going West.

Tom has asked me to thank all of you for sending on this information about your activities, as it is most helpful to the Secretaries to have you contribute.

Twenty members of the Class celebrated our fifth reunion on Alumni Day back on June 23. As the marked reunion of a class which includes on its rolls some 1,060 names, it was not much of a success. But for a war year with many men overseas and others at difficult-to-travel distances, we did fairly well; at least there was a showing. The festivities centered around a beer party at the Sigma Chi House in the afternoon. Those present were A. N. Ackerson, Dick Berry, Bernie Carver, Harlan Davis, Bob Deutsch, Jack Dineen, Bob Grosselinger, Alvin Gutttag, Russ Haden, Bob Hess, Hal Hobkirk, John Hollomon, W. Z.

Hwa, Jack Leschen, Fred Loomis, R. H. Peak, L. A. Sutton, Arnie Wight, and Joe Wiley. Afterward a small but reasonably noisy group attended the Stein-on-the-Table Banquet for the program which was reported in the June Review. Our thanks go to Frank Penn for getting out the notices and making all the arrangements. Everyone had better start now saving up for our 10th reunion, because it has got to be a real show. If necessary, we will rent out J. Worth's whole establishment.

Several of the boys sent in brief notes on the occasion of the reunion. K. T. Jackson with his regrets mentioned that he had met Wylie Kirkpatrick in Paris. He had also heard from Roy Brown who at the time was with a fighter group in one of the tactical air forces in France and Germany. Norm Klivans talks about his job with the Army Air Forces Weather Service in the Marianas. What we hear is a description of the informal duties of an operations officer. They start with those of chaplain, whip, bird-dogger, and wind up with those of paper-shuffler de luxe, and crystal ball gazer. What will he expect from that desk job in Chicago to which he is coming back? Bob Harper sent in his regards from the Navy in the Pacific. Added to his letter was a postscript by Don Timbie '39. Joe Owens is also out there somewhere as commanding officer of a mobile torpedo overhaul shop. He says he has covered most of the southwest Pacific in his journeys.

Notes also came from George Carnrick in Santa Fé, N.M., Commander Peter Lackner in Washington, Don Monell in Germany, Bob McKinley in Washington, John Lutz, somewhere in the Pacific, Dick Mabee in Germany, and many others. Marjorie Hutzler sent in news of Dick's career in the Navy. For a while after receiving his commission, he was doing experimental engineering at the Naval Aircraft Factory in Philadelphia. In September, 1944, he was sent overseas for duty which has taken him to the Admiralties, the Philippines, and the Netherlands East Indies. Some of his time was spent aboard a seaplane tender. One of his particular jobs was the packaging and preservation of aircraft parts. His latest assignment, as reported, was with a Flag Utility Unit.

The Class should be interested in a letter received last summer from Theodore Edwards, a first-class seaman, and written when he was at the Service School Command of the Great Lakes Naval Training Center: "Somebody told me that this is one of the largest (if not the largest) naval training bases in the country. Anyway, I'm here at the moment, and for a month more. But perhaps I'd better begin at the beginning and give a brief résumé of my activities since 1940, when I left the Institute, since I have never written you before: For one year, 1940-1941, I worked in Dover, N. J., for the Alan Wood Steel Company as junior mining engineer. I left there and went to work in New York City for the Eimco Corporation as sales engineer, selling, servicing, and installing mining and industrial equipment. This pleasant job ended on September 1, 1944, when the Selective Service Board decided I had had enough deferments. So I was drafted into the Navy — the Navy by personal choice. I spent 12 weeks at Sampson, N.Y., in boot training. Then after 44 days in O.G.U. the

Navy sent me on my way to become an R.T. (radio technician). Professionally, I hold a mining engineering degree — but the Navy has no mines. So I went to Wright Junior College in Chicago for preradio training. This lasted a month. Two months ago I was shipped here. After finishing the final third month here, I shall be shipped elsewhere for seven to eight more months. Then I shall be finished — unless by that time they further extend the course. R.T.'s learn about radar and radio — uses and maintenance. It is not bad duty, as we say in the Navy. Do you ever hear anything about John Simpson of Course III? He is in the Navy, but where I don't know." — H. GARRETT WRIGHT, *General Secretary*, 1040 Lombard Street, San Francisco 9, Calif. *Assistant Secretaries*: THOMAS F. CREAMER, 2032 Belmont Road, Northwest, Washington, D.C.; JOHN L. DANFORTH, Room 24-222, M.I.T., Cambridge 39, Mass.

1941

Back again, with bits and pieces of clippings from our letter bag — for instance, Weedon, writing from the South Pacific, says: "Unfortunately I've not run into any of our classmates out here since last writing you. Bill Shubert is back on temporary duty on the West Coast for a few weeks, so I cannot even give you any news on him at the moment. I'm glad to see by the papers that Technology is recognizing that there will be a big postwar problem for educational institutions. I'm convinced that much of our own domestic trouble can be traced to poor education and only hope that we all can and will share in rectifying prior mistakes."

We have also heard from Les and Alice Gott up in Watervliet, as follows: "Les has been taken up with writing a technical article for *Iron Age*, and planting a garden. The former has kept him busy for about two months, but it has been finally completed except for a few minor corrections. *Iron Age* had asked Les to write this particular article on precision castings, and we are now hoping they'll accept it for publication. As Les put it, he has set down the bare facts and the plain truth, whereas most articles have a tinge of the dramatic. We were pleasantly surprised lately to receive a telegram from Ian MacLeod '40, informing us that he was returning overseas after a leave at home, and asking us to meet him between trains at the station. Though mildly put out to think that he had been home without letting us know before this, we hopped down to the train and chatted with him for about 15 minutes in the privacy of a drawing room he was sharing with some other fellow. Ian looked the same, was as jovial as ever, and hadn't changed at all. He said he had heard that Irving Berman was about due home for a leave or rotation. (We hope this is so, and that Butch will let us know when it happens.) He flew to the States and seemed to have enjoyed it. His return trip was to be by ship from Seattle. At present, he is stationed just south of Saipan.

"We have heard from John Bone recently. It seems he left the West Coast on the morning of Easter Sunday for some place in the Pacific. He mentioned that Bud Gleason '43, II, was shipping out with him, and he got "seconds" on the February issue of *The Review*. John thought that

his outfit would go to a replacement pool in Hawaii, although scuttle butt had it they'd go to Guam. His schooling on the coast had been cut short on account of the high casualty rate on Iwo. An interesting fact: there happens to be another John E. Bone, but in an assault signal corps."

Ted Ferris comes through with the following news: "It's about time I wrote to you after all these years. After graduation in 1941, I returned to the Institute for a year and got an M.S. in Chemical Engineering. I then took an engineering research job with National Aniline in Buffalo, N.Y. After five months there, from June to November, 1942, I transferred to the General Electric plastics laboratory in Pittsfield, Mass., where I stayed until February, 1944, when I entered the Navy as an ensign. My present duties are in ordnance at the ammunition depot in Seal Beach, Calif. That is not all that has happened to me. On June 26, 1943, I married Doris Donaghue of Dorchester (and Radcliffe, 1941), and our happy family now numbers three, a lovely (we think) baby boy, William Paul, having arrived on February 16 of this year. In February I had another thrill — from publication of my first professional article, in *Modern Plastics*.

"So you see, I have not been idle — but enough of this bragging. I have continually watched *The Review* and often wondered about many of the old '41 men. It certainly would be good to hear from Bill Cadogan, Jack Lyons, Dick Bartlett, and John Barker. I still correspond with Alan Baum, who continues plugging away for Hercules Powder in Radford, Va. While spending some time in Washington, D.C., a year ago, Doris and I were honored with a visit from Monroe Norden, who was, and still is, as far as we can ascertain, employed in a technical capacity at the Aberdeen Proving Grounds, you know where."

The following comes from Dave Shapiro: "I'm still with the Hazeltine Corporation (since August, 1942). I spent six months of last year working for the company at the Naval Research Lab in Washington. While there, I established communications with Milton Sanders, a junior grade lieutenant, and his wife Frieda, with Mrs. Sol Goldfarb, and John Renner, an Army captain. Willis Ware '42 and Al Hayes '42 are also here at Hazeltine. Incidentally, life is wonderful. Miss Adele Zankell of Brooklyn has been Mrs. David Shapiro since December 3, 1944. Please convey my regards to the rest of the Class."

We have also received announcements from Captain and Mrs. Irving Koss of Barbara Elizabeth, who arrived on April 20, and from Captain and Mrs. Sturm Kussmaul of a daughter born on May 26.

A press release from Fort Sill, Okla., runs as follows: "For meritorious service in direct support of combat operations at Bougainville, Solomon Islands, Technical Sergeant George O. Lloyd, Jr., an operations sergeant in the fifth training detachment of the Field Artillery School here was recently presented with the Bronze Star. . . . Sergeant Lloyd, son of Mr. and Mrs. George Lloyd of 9 Albert Avenue, Winthrop, Mass., enlisted in the Army in January, 1941, while attending . . . Technology. He sailed for overseas service in January, 1942, landing in Australia. He was with the first troops of the America

Division to land in New Caledonia; he also served on Guadalcanal and later on Bougainville. According to the citation awarding Sergeant Lloyd the Bronze Star, 'he developed and operated a flash base board which was principally responsible for the excellent results obtained by our artillery in locating and neutralizing enemy field pieces.' Sergeant Lloyd returned to the United States early this year and was assigned to Fort Sill, where he now resides with his wife."

A short note from Professor Locke '96 tells us: "John F. Sexton '41, a lieutenant, writes me that he is going overseas and that John G. Wheale '38, a captain, whose address is Springfield 3, Mass., will succeed him in the office of secretary of the Technology Club of the Connecticut Valley. I understand that Captain Wheale has recently been reassigned to Springfield. You should also note that Theodore F. Lange Vice-president, became acting president when Otto Kohler moved to Boston."

Best wishes to Johan M. Andersen and Elsie Spalding for their marriage which took place on May 18. — Announcement has been made of the engagement of Helen Park to William P. Haskell, a Navy lieutenant, and of Carolee Seagram to C. Phillips Purdy, Jr. Virginia F. Snyder is engaged to Donald Brown Cameron; and at Brockton, June Archibald became the bride of Harold Andrew Lent.

We have two deaths to report: In 1943 Pierre G. Barbey was killed, and in 1944 Arnold M. Reynolds was killed. We have no information concerning either of these tragedies except the dates. Our sincere sympathy is extended to the parents of the men named. We regret such expression is so tardy in its appearance.

An announcement from Mr. and Mrs. Joseph G. Gavin, Jr., entitled, "Detail Specification for Experimental Model," follows: (1) This specification and its appendices apply to the design of one small freewailing Gavin equipped with the usual number of arms, legs, eyes, and so forth. This particular item shall be known as Joseph Gleason Gavin, 3d. (2) This youngster shall be capable of development in accordance with all applicable specifications in force at date of birth, 2 April 1945, and such others as are later enforced by parental determination. (3) Characteristics of this model are as follows: Gross weight — 7 pounds, 8 ounces; type — male; capacity — not yet determined; armament — two; equipment — three-cornered pants. Prepared by Dorothy Dunklee Gavin; approved by Joseph Gleason Gavin, Jr., Lieutenant, U.S.N.R. — STANLEY BACKER, *General Secretary*, Philadelphia, Quartermaster Depot, 2800 South 20th Street, Philadelphia 45, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

1942

Since *The Review* does not come out in the summer, this is the logical place for a brief report on the Alumni Banquet. If we can remember back that far, it is easy to recall that those were the days when conventions were banned by the government. Consequently, our only representation was by the local boys plus one or two fellows who happened to be in town on business. The banquet went off in its usual style, but

the best that our Class could do was muster one full table. From left to right, the faces read as follows: Stan Golembe, who is still passing the time of day over at the Radiation Laboratory; Warren Loud, who is teaching in the Department of Mathematics at the Institute with every expectation of a Ph.D. in the near future; Pete Hellige, who is also working in the Radiation Laboratory and incidentally is now boasting of a two-year old son and would pick a quarrel with this column for never having published his birth; Jimmie Engel, who happened to be in town for the occasion and is working for Federal Telephone in Newark, N.J.; next, two members of Polaroid's mighty staff in the persons of Lou Rosenblum and Dick Seidman; the one other out-of-towner, George Spies, who is working with Air Reduction; Allan MacNee, also from the Radiation Laboratory; Malcolm McGregor, who told glowing tales of Raytheon's contributions to the war; Bob Howard, who is working in the Metallurgy Department towards his Ph.D.; and last but not least, still another Radiation Laboratory specialist, Dave Nicholson, who filled out the table along with your Assistant Secretary.

The engagements are pretty heavy, and the weddings are all too few. In the former category we have the following couples signifying their intentions: George Schwartz and Carole Swartz; Bob Frost and Mary Metcalf; Dean Lewis and Ellen Parkhurst; Fred Chase and Elizabeth Brock; Bob Curtis and Eleanor Johnson; Courtenay Crocker and Nancy Ballou; Carl Meurck and Jacklyn Fisher; Frank Herlihy and Kathleen Donovan; Rene Bourguet and Frances Madden; Joseph McHugh and Elizabeth Costello. The news of only four weddings has come our way — in Reading, Pa., Everett L. Meley, Jr., a junior grade lieutenant, and Helen D. Watson were married on July 7. On June 23 Bill Finney and Barbara Bunker were married in the Memorial Chapel at Harvard University; they are reported to be living in Washington, D.C. Away back on April 2, Wendell Phillips was married to Janet Cooper in Walden, N.Y. The last wedding to be recorded is one which may surprise many of us: the one and only C. R. Stempf is now a married man! Mrs. Stempf is the former Nancy B. Wight of New York City. We assume that Charlie is still in the submarine service, since the ceremony was performed on August 3 in the chapel at the Submarine Base, Groton, Conn.

Even though the war is over, there is still much news of the fellows who are in the service. The headlines say that some time back Irv Kotler was flown home to the United States in a C-54 Navy hospital plane. Until a few months ago he was still at the St. Albans Naval Hospital on Long Island. Let's hope that he has completely recovered. We hear indirectly of Jim Larkin, an Army captain, who has had some rather unusual experiences. It seems that on June 30, 1944, he was captured at Anzio and thereafter spent many long months in various Italian prisoner-of-war camps and later in German prisoner-of-war camps. Previous to that, he had also won the Silver Star. At present he is in an Army Ground and Service Forces Redistribution Station, getting three square meals a day, for which he is very thankful. Excerpts

from a letter from Reece Wengenroth show that he must have been in some rough action in Germany for which he has received the Silver Star. Evidently he has participated in quite a number of campaigns — eight in all, including Africa, France, and Germany. He received the Purple Heart way back in November of 1942 but says that it wasn't anything serious.

A letter from Dick Russell arrived some time ago and brought his status up to date. He has been in the Army right along and is now a captain in the Ordnance Department, spending the best part of his time at the Watertown Arsenal. What with a little leave here and a little leave there, he has picked up a wife, a couple of dogs, a six-months-old baby daughter, and a nice apartment. Mrs. Russell is the former Shirley Redfield, Wellesley '42. Another letter has come in from Fred Gander, who is evidently on the staff of Fleet Air Wing Two somewhere in the Pacific. He also wishes us to note the fact that this column has never announced the arrival of one male offshoot in the autumn of 1943. Fred W. Gander, Jr., must be a couple of years old by now. Our humble apologies to those members of the Class who do happen to have male offshoots. Frank Canney's mother has forwarded some information about him. Frank served for 16 months on the U.S.S. *Franklin* and was awarded the Bronze Star for heroic action. Shortly after leaving the *Franklin*, he was married to Isabel Oliver from Norfolk, Va., and should by this time be in line for discharge. According to announcements, Harvey Kram is the proud father of a 6-pound 9-ounce son as of April 15. This latest addition to the Kram family will henceforth be known as Leonard William.

All of a sudden of late a considerable number of fellows have been dropping into the Institute. Walter Kneeland is back in "civvies" and actually attending good old Technology again. Bob Imsande came in about a week ago. He has been sitting out the war in one of the "lousiest jungles" in existence. It seems that the Army saw fit to send him to Brazil in the far regions of the Amazon. After two or three years in the jungle, Bob is delighted, to say the least, to get home. Harry Helm recently popped in out of nowhere. He seemed to be on some sort of leave and had something pretty much on his mind that he wanted to do. I wonder what that could have been? Hawk Shaw is now an interne at one of these hospitals around Boston. Please, no cracks for my not remembering which one. Also, he is now a married man, and he and the Mrs. play a pretty good game of bridge. Jim Littwitz, a captain in the Chemical Warfare Service, was lately caught wandering around the main lobby. He has been overseas for pretty nearly three years and is now on terminal leave. About two months before going overseas, he was married and is now anxious to settle down and see what married life is really like. Art Gow is also back for a few days. Needless to say, he has wild tales to tell about life in Germany. He received some slight wounds before Germany's capitulation, but they sure didn't hold Art back any at all after V-E Day. He claims that the troops over there are really having themselves a time. Carl McGinnis is now on terminal leave in San Francisco and expects to re-enter the Institute to do

some graduate work sometime this winter. Incidentally, Carl has had a Distinguished Flying Cross for some time now, but wouldn't tell a soul until it came time to tabulate the points for discharge, and you can bet your bottom dollar he came up with it then! These modest people! — S. YOUNG TYREE, JR., Assistant Secretary, Room 2-215, M.I.T., Cambridge 39, Mass.

1943

I find it hard to write a suitable introduction to these notes for many reasons. In the first place, we are beginning herewith a new volume of *The Review* and must therefore include the usual injunctions, or perhaps we should call them requests, for a copious supply of mail filled to the point of overflowing with news which can hardly wait to be put into print. That's a lot more than a hint! Then, in the second place, the termination of active hostilities surely calls for comment. Yet as there seems little that has not been said by now on that subject, to avoid plagiarism, I shall resist any ambition to become a peacetime editorialist.

At the risk of dampening the victory celebration, however, I regret that I must inform the Class that one of its members has recently been listed as missing in action: Douglas G. Fenton, a junior grade lieutenant, the radar officer in the submarine *Kete*, which is reported overdue. Our deepest sympathy is extended to Doug's wife and family.

During the summer, church bells rang for many in the Class, and word has come to hand that the following were among those who have taken on better halves. In New Haven, Conn., Jim Hendell, a captain in the Army Air Forces, and the former Jane Seabury were married on April 18. Shortly before his wedding, Jim returned from Europe, where he was a B-17 pilot with the Eighth Air Force and had completed 29 missions. June 23 was the eventful day for William Burrage and the former Hope Wallach, wed in Warrington, Va. Wrentham, Mass., was the setting for the marriage of James Thomson, a lieutenant commander in the Navy, and Marion Winter. Marion is now a research assistant at Technology, and Jim is on sea duty. On May 12, the former Barbara Straub became Mrs. Pierre Portmann in Bellerose, N.Y. Phyllis Robinson and Stan Roboff, a lieutenant in the United States Engineers, were married on June 23 in dear old Boston town. Anne McJunkin married Frank Briber, a junior grade lieutenant, on May 3 in Charleston, W. Va. Frank was at Tech for about a year after graduation doing research work and on joining the Navy was stationed at a naval training center near New Orleans. Finally, in Cambridge, on August 18, Shao-Ti Hsu and the former Sha-Nah Chien took solemn vows. Both the bride and the groom in this wedding had had a long and arduous path to follow before they reached the altar. In 1943 Shao-Ti's ship from China was torpedoed off the Brazilian coast, where he drifted for three days in a lifeboat before being picked up. His bride left Chungking early in April and boarded the Gripsholm in Bombay, finally arriving in the States on the second of August.

The list of those who have declared their intentions, as long as the list of weddings, begins with Mary DeVine of Easley, S.C.,

and Dumont Rush, at present a research assistant at the Institute. A Hartford, Conn., newspaper carries the announcement that Vic Darnell, a junior grade lieutenant, and Jane Pritchard of New Britain, Conn., will soon be married. Vic is a repair and construction officer in the Philadelphia Navy Yard. Virginia Creighton of Hopedale, Mass., will shortly become Mrs. Charles Burnham. Charlie is a captain in the Army Air Forces, stationed at Wright Field, Ohio. Announcement has been made of the engagement of Betty Bird of Rome, N.Y., and Frank Smith, a Signal Corps lieutenant, who has gone overseas after receiving special training at both Harvard and Technology. Marylin Golinko and Harold Gershenow will be married in the not too far distant future. Marylin's home is in Great Neck, N.Y., and Harold is serving as a junior grade lieutenant in the Atlantic. Arthur Vershow, now at the Radiation Lab at the Institute, and Charlotte Zimmerman of Brighton, Mass., are engaged. Ruth Guillen of Hollis, N.Y., and Dick Foley will be married in the very near future. Dick is with the Pratt and Whitney Aircraft Company at Hartford, Conn. Alice Stubing, whose home is Mount Vernon, N.Y., and Bob Maxwell, another junior grade lieutenant, will be married shortly. The Brooklyn Navy Yard is Bob's station these days. To close the list for this month, we have heard that Kathleen McIntire, who was graduated from the Institute with a degree in Public Health, is engaged to an Army sergeant, Emmet Logue.

The public relations officer at Fort Sill, Okla., has sent us a very official looking document which tells us, in addition to the fact that Myron Shoffner, a lieutenant, was graduated from Technology, that he is now stationed at the Field Artillery School at Fort Sill. — John Guillotte has been working on the atomic bomb. Before his association with this project, John was with the Remington Arms Company in Bridgeport, Conn., and was later one of several in the Class to join the "Manhattan Project." John (in his spare time?) has also written two books on mathematics since leaving the Institute. According to my records, others associated with the atomic bomb were Stan Roboff, Bob Schrader, Wallace Stone, Tom Mitchell, Bud Babcock, Warren Fuchs, and Marion and Gilbert Monet.

Turning to the mailbag, we find a short note from Harold Rosoff, who is aboard the U.S.S. *Ransom*. He writes: "Having studied food technology and industrial biology at Tech, it was natural for me to become a communications officer, according to the great naval minds. Upon completing six months at the Harvard (ugh!) communications school, I was assigned to the U.S.S. *Nucleus*, a mine sweeper. I served 17 months in this ship in the north and south Atlantic, the European theater, and the Aleutians. I was then given a recuperation leave and a long tour of shore duty (23 days) in the United States, followed by my present assignment as staff officer to the commander of a division of mine sweepers, which is a good job, but still in a mine sweeper."

Johnny Harsch lets us know that he has "finally ended up in Berlin, after a month of waiting around in the German countryside. I am now working in the Public Utilities section of the Berlin military govern-

ment. I've been meeting a lot more engineers than in my earlier career but still haven't run into any Tech men. As you probably know, fraternization is now permissible here; and as you might expect, practically everyone is taking full advantage of it — I myself to a limited extent, but I should still prefer to be in France or England as far as the civilians are concerned. Naturally, many interesting situations develop, with the armies of four nations in a single city along with the occupants. My contacts with the Russians have been seriously restricted by the fact that I know only 10 words of Russian, and they usually know no English, French, or German. Otherwise I have gotten along very well."

We also hear from Louis Schwartz. Until last summer he was "having a soft time of it in the Signal Corps (Detroit Signal Laboratory). But last August," he continues, "I took advantage of a current W.D. circular and transferred to the infantry. After nine months of infantry, parachute, glider, and parachute communications training, I finally came overseas and have been with the Eleventh Airborne Division for nearly two months. It is a dandy outfit and has a magnificent record over here. My job is that of communications officer for the First Battalion, of the 187th Para-glider Infantry Regiment. At the moment, we are training in an encampment in southern Luzon. We're located in a huge, rolling, coconut grove and really can't complain about the situation. There is little entertainment except for G.I. movies and the occasional Special Service Show (we saw *Oklahoma* last week), but we get to Manila on some of our week ends and have a big time there. Although Manila is largely a shambles, there is plenty of opportunity for wine, women, and song. Prices are sky-high; a little Filipino shoeshine boy gets one peso (50 cents) for a wretched shine! We tell them that they would never get by in the States — only 10 cents a shine! Read Stevens is the only fellow I've heard from recently. He's in the submarine *Blenmy* as engineer officer. Although he likes Australia, he seemed fed up with the submarine life after several months at sea."

And lastly a word from Bob Rorschach. "I just love to see my stuff in print, so after noticing the June issue of *The Review*, I decided to send in another letter. The old *Pickaway* has run over a lot of water since you last heard from me, seeing Guam and Iwo Jima on the way. You have no doubt heard the expression 'the Hot Rocks.' Well, that was Iwo. We arrived late, but the Gyrenes were still at it, hot and heavy. There were flares and rockets by night, artillery and flame throwers by day. The souvenir racket is really getting tough these days. All I have been able to get is a piece of Japanese money, which I gave to a friend. I have also a piece of a Jap Zero that may eventually turn out to be a watchstrap if I ever get down to work on it. The penalty for buying, selling, or trading enemy material is \$5,000 and three years. It's a hard war. There is an amendment I must make to my last letter. I am about to be engaged. The young lady is Janice Newton of San Francisco, and the occasion is my next trip back. It all came about after six months of correspondence with two weeks in the States at either end. To make

things just a little clearer, we were there only recently, at which time Miss Newton and I arrived at a decision. The ranks of bachelors are thinning. I have received a letter from Ronnie Provost, a fraternity brother and classmate of mine in Course X, so I'll pass the news along to you. He's still working for United States Rubber in Charleston, W.Va., and seems to be doing very well. As a matter of fact, the junior chamber of commerce is about to make him a member. Last, but not least, he and Mary are expecting a second addition to their family in a few months."

We take great pleasure in printing the following citation awarded to Donald Stevens, a junior grade lieutenant, who was with the 26th Submarine Fleet in the Pacific. "For distinguishing himself by the excellent service as (radar) operator on a vessel during her . . . patrol in the southwest Pacific areas, Lieutenant (Junior Grade) Stevens' outstanding energy, zeal, and skill in supervising the operation of the equipment in his department and maintaining it in excellent condition, despite numerous material failures, greatly assisted in the continued safe navigation of his ship in treacherous enemy waters and in the procurement of vital information concerning enemy movements. His actions contributed considerably to the inflicting of heavy damage on the enemy and to his ship's safe return to port . . . For his conduct throughout he is commended and authorized to wear the Commendation Ribbon."

And so we come to the close of another chapter of the class record. Turn to the end of next month's *Review*, and, Uncle Sam willing, I shall be on hand to write some more. — CLINTON C. KEMP, *General Secretary*, 15 Rokeby Place, Staten Island 10, N.Y.

1944 (2-44)

After a long lapse our notes finally appear again. Most of the news is rather old and secondhand, but we hope it will arouse enough interest to attract some mail with newer news.

Dick Whiffen, an ensign, sounded bitter in a letter of last spring complaining of the absence of class notes. He came through with the following: "Ray Corwin is an ensign stationed at the naval air station at Alameda, Calif., and was married to Shirley Davis in August, 1944. Langdon Flowers is an ensign, married, and in aviation maintenance. John Toland is already a first lieutenant and in Army Ordnance at Aberdeen, Md. Carl Roden is an ensign attending radar school at the Institute. Walt Swain is working for Carl L. Norden Company in New York. Stanley Falconer is an instructor at the Navy's Radio Matériel School in Washington, D.C. I went overseas last September but was brought back after five months and at present am at the Naval Research Lab in Washington."

Other news comes via newspaper clippings, press releases, and change of address notices. Of prime importance is word of the death of our Class President, George A. Schutte. George was killed in action last February 12, while serving as a lieutenant with the First Army in Luxembourg. Paul G. Nelson, an Army lieutenant, was killed in action in Belgium on January 5, and another Course II man, Elbert B. Pritchard,

who was an ensign, failed to survive wounds received in action in the Pacific theater. William D. Grant, a flight officer, was killed in action in August, 1944, while serving with the Royal Canadian Air Force. James S. McClave, XV, an ensign, was also killed in February, on the 28th. Henry C. Shepard was killed in Humming, China, on September 18, 1944, while in the Air Forces. We regret the absence of further details in each of the above cases.

James R. McKelvey, an ensign, died in the Marianas on June 1, after being wounded off Okinawa. He was severely burned when an enemy plane exploded aboard his ship during a combat operation. He had left the Institute in his senior year to enlist in the Navy. He was graduated from midshipman training and received his commission in February, 1944. After studying diesel engineering at Penn State, he was assigned to the Pacific area as an engineering officer.

Harold Connett, Jr., who joined the Navy in April, 1942, and became an ensign, was also killed in action on June 20, 1944. After training at Chapel Hill, N.C., and Grosse Isle, Mich., he had received his wings and commission at Pensacola. After further training, he had been assigned to a carrier, on which he went out into the Pacific. According to information received from his father, he took part in strikes against Wake and Marcus islands, and Tinian, and covered the landing at Saipan in June. On June 20, he took part in his last action against the Japanese fleet, in the first battle of the Philippine Sea, for which he received the Air Medal. It is thought that he had been recommended for the Distinguished Flying Cross.

On behalf of the Class, we wish to extend our sympathy to the families of these men who died in the service of their country. As friends and classmates we knew these men and deeply regret their passing.

Dick Knight, a second lieutenant, has received a second Oak Leaf Cluster to his Air Medal, for "courage, coolness, and skill" while participating in bombing attacks on Germany as navigator of an Eighth Air Force B-17. Alden West, a first lieutenant, has been awarded the Distinguished Flying Cross for "extraordinary achievement in combat aerial flight." In addition, he wears the Air Medal with four Oak Leaf Clusters. Maxwell Van Valen, a first lieutenant, pilot of a B-24 in the Pacific area, received the Air Medal for meritorious achievement while participating in dangerous missions early this year. He has seen action in New Guinea, the Dutch East Indies, Palau Island, and the Philippines.

Caleb Taft, an ensign, has apparently had a little excitement on a Patrol Torpedo boat out in the Pacific, being reported to have made 20 combat patrols in five months. One patrol saw his and another PT using native guides to go up a narrow channel on the northeast coast of Borneo to blast a Japanese concentration point at the town of Belonan. Results were unknown, because they "got out in a hurry" when the Japs opened up with machine guns. — Stan Skelskie, an Army lieutenant, has been flying a B-24 over Formosa and the China Sea, as part of a bomber group credited with the downing of three Japanese planes and sinking of two Japanese

ships. — Another classmate to make the headlines is Peter Hopkins. As a member of the American Military Mission to China, Captain Hopkins advised the Chinese in an unusual military maneuver west of the Salween River. When the Japs held out on the top of Sungshaw Mountain, delaying the battle to regain the Burma Road, Hopkins directed the Chinese in tunneling under the Japanese stronghold, then simply blowing the Nips off the top of the mountain with three tons of T.N.T. — Joel I. Wagman, a first lieutenant, commanded one of the first platoons of American infantrymen to fight their way into and liberate Bologna during the offensive which resulted in the German surrender in Italy.

Walter R. Goat was commissioned an ensign upon graduation from the Coast Guard Academy at New London, Conn., last June, and was married to Norma Clear soon after. Stephen Knight, VI-A, was recently promoted to the rank of lieutenant in the Navy, and Richard F. Wiggins from that of lieutenant to captain in the Army. Albert Weldon, a Navy lieutenant commander, was at the Pratt and Whitney plant in Hartford, at last reports. Paul Heilman, Spence Schilling, Ken Rehler, George Funk, Austin Dodge, Dick Vail, Lang Flowers, Stan Warshaw, Dick Macconi, Al Madwed, Bob Oppenlander, Clyde Snyder, Caesar Spero, Bill Stewart, and John Stryker, all ensigns, had addresses care of the Fleet Post Office, San Francisco. Ed Jefferson, X, an ensign, was at the Submarine School in New London. Kamar Field and Herb Graetz were working for Merck in Rahway, N.J. Charles Burns was working at the Food Technology Labs at the Institute. Jack Littleford, Joe Crowley, Kelly Damsgaard, Edward Hong, and Dave Feingold were attending Navy radio matériel schools. Paul Robinson and Bob Meny were both lieutenants in the Army Air Forces. Andy Vallone was at the Navy fire control school in Washington, D.C. Risto T. Hukki was working for the Phelps Dodge Corporation at Morenci, Ariz., and another member of Course III, Ray Jerome, was working for the American Brake Shoe Company in Los Angeles.

Of the coeds the following is known: Dorothy McKernan married Ross Salisbury at Annapolis after having worked at Curtiss as an engineering cadette with Brabar Howe, who has also married. Barbara Green was working for American Airlines in New York. Harriet Aldrich was married to Dr. Edgar A. Bering, a Navy lieutenant, and a graduate of Harvard Medical School.

Speaking of marriage, a great many of the Class have taken the fatal step. Lieutenant Bob McCandliss married Virginia Goodall, and Lieutenant Dean Picton married Bebe Edwards. Other nuptials include those of Ensign Hank Bowes and Margaret McKenney, Gordon Smith and Beverly Bushnell, Lieutenant Art Karol and Marjorie Warren, Warren Schilling and Sylvia Spring, Corporal Robert Byrne and Margaret Bacon, Ensign Sam Morrison and Betty Urban, Ensign Fletcher Pyle and June Murphy, Lieutenant Ed Cumpston and Catherine Maguire, Ed Eaton and Rita Shachat, Lieutenant Jay Martin and Anita LeBlanc, Ensign Seth Washburn and Janet Higginbotham, Paul Travers and Bernice Herzog, Arthur Komarek and Dorothea Manchester, Ensign John Gibb and Ann

Ward, Lieutenant Carl Eyman and Leslie Whitcomb. Thacher Clarke now in charge of the cyclotron, was married to Elizabeth Hewitt. We send our congratulations and best wishes to all.

That is all for now; there'll be more next month. Meantime, how about some letters and some news of yourself and your friends in the Class and of what you and they have been doing since last we heard from you? Any additions, corrections, or criticism of any of the above will also be welcomed. And don't forget the Alumni Fund. — WILLIAM B. SCOTT, *General Secretary*, 283d Engineer Battalion, A.P.O. 655, care of Postmaster, New York, N.Y., JAMES E. GALLIVAN, JR., *Assistant Secretary*, 430 Adams Street, Dorchester 22, Mass.

1945 (10-44)

Since our last word in The Review some four months ago, a few changes have taken place in the international relations of the world and in the location of our armed forces. Consequently, some of the news of those who suffered through a year or more of books and slide rules with us may be sorely outdated, but it's presented regardless, with all due apologies for tardiness.

John W. Connors, a second lieutenant who studied meteorology, actually got around to applying some of it as weather forecaster in the Westover Field, Mass., weather detachment. George Kendall Parmelee was with Patton's Third Army in Germany last spring. Roland Wilkinson, an ensign, served on a heavy cruiser with the Atlantic Fleet. He attended the Cornell University midshipman school and also fire-fighting and damage-control schools in Philadelphia. Harrington Ricker has been a radio technician aboard a destroyer in the Pacific. He was in on the invasions of Guam, Saipan, Leyte, and Guadalcanal. Dick Knight had completed some 26 missions as navigator for a B-17 of the Eighth Air Force before V-E Day.

Frank Guptill, Jr., an aviation radioman, was shot down in a Navy Helldiver in the battle of the China Sea last April 7 during an engagement with the battleship *Yamato*. His plane, however, hit the ocean far enough from the scene of action that he was rescued by an American warship after one night in a life raft.

Joseph B. Davidoff, an ensign, has been on duty under instruction in the industrial department of the Puget Sound Navy Yard in Bremerton, Wash. Ralph L. Evans, Jr., an ensign, was graduated from the Naval Air Training Base at Corpus Christi, as a naval aviator. Woodward D. Bachman, an Army lieutenant, has been serving as personal affairs officer at Abadan Air Base, Iran, in which capacity he may have to do anything from explaining voting regulations for soldiers to giving advice on marriages or divorces. (It's probably usually legal advice, however.) Stephen King, a cadet at the Coast Guard Academy in New London, Conn., has earned a varsity letter in sailing and should receive his commission in 1948. Gerome Gordon received a commission as second lieutenant at Quantico, Va. Theodore Davis, a staff sergeant who had previously been reported as missing in action, was a prisoner of war as of last May. He was serving with the Seventh Army when he was captured. Joseph Corso was a private with the Third Army in Ger-

many at the time of the German surrender.

We have word that two more have given up the esteemed title of bachelor. Donn Langdon Ashley, who was graduated from the Naval Academy at Annapolis, was married to Nancy Uhlenhaut of Boston. Lieutenant Richard John Merrow, an Army lieutenant, married Joan H. Moffette, an ensign in the Navy Nurse Corps. Clinton

W. Murchison, a lieutenant in the Marines, became engaged to Jane Coleman last June. Sergeant J. V. Kelly took a similar step with Eleanor Mann of Wheaton College. Other engagements we have heard of are those of Bruce Lamberton, an ensign, and Jacqueline Edmunds of Simmons College, Joseph D. Dennison and Ruth I. Wilhelm of Boston University, Howard Adrian

Zwemer, a second lieutenant in the Army, and Jane Hammett of Smith College, and Louis I. Zirin and Ruth Barbara Hackel of Simmons. — JAMES S. MULHOLLAND, JR., *General Secretary*, 1172 77th Street, Brooklyn, N.Y. *Assistant Secretaries*: RODERICK L. HARRIS, 1 Winchester Street, Brookline 46, Mass.; JAMES B. ANGELL, 5800 Amboy Road, Staten Island 9, N.Y.

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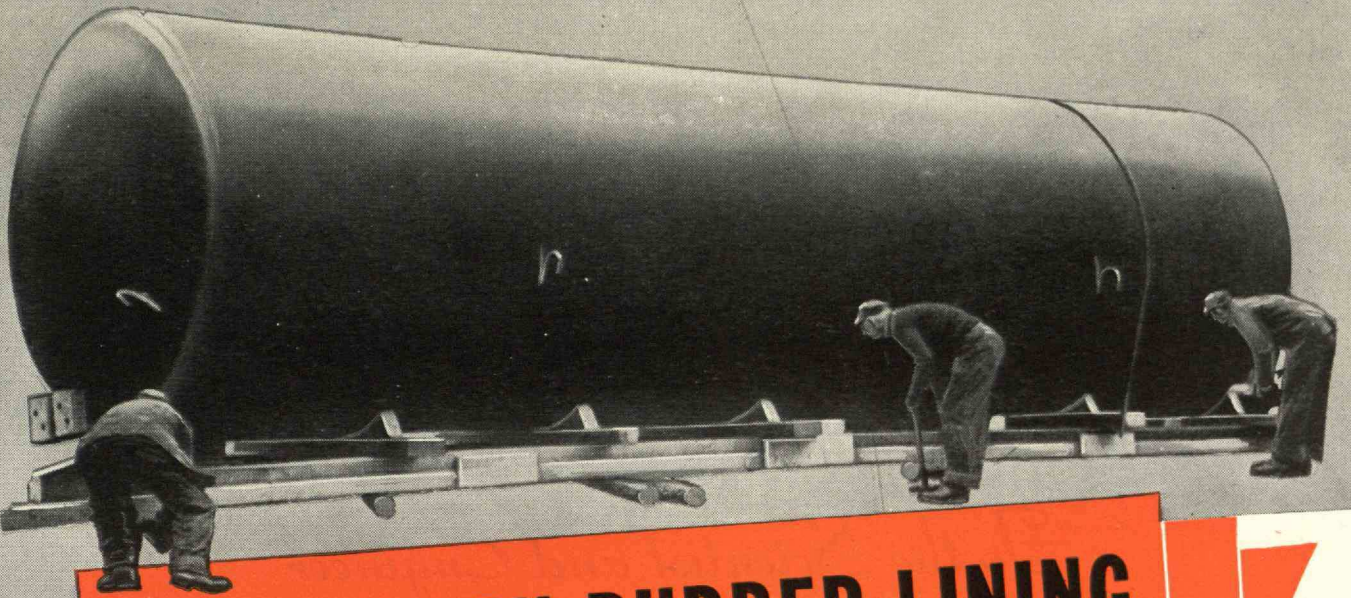
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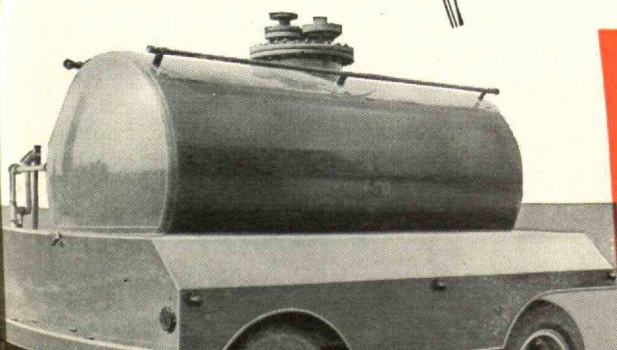
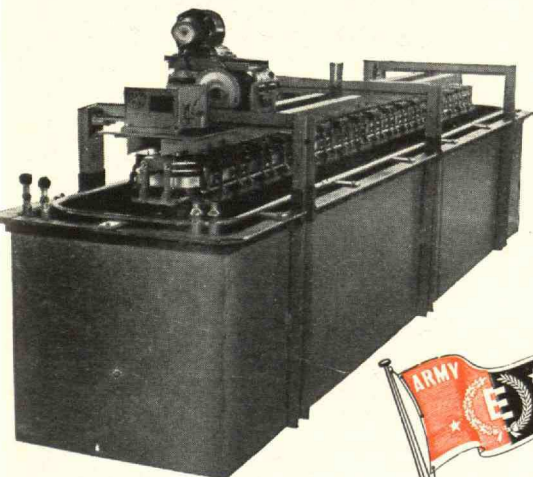
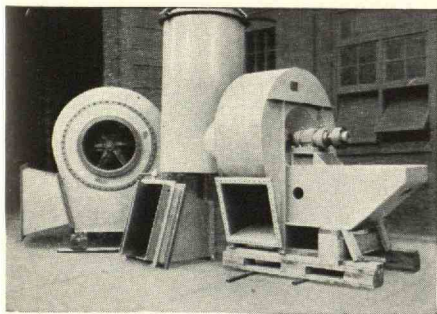
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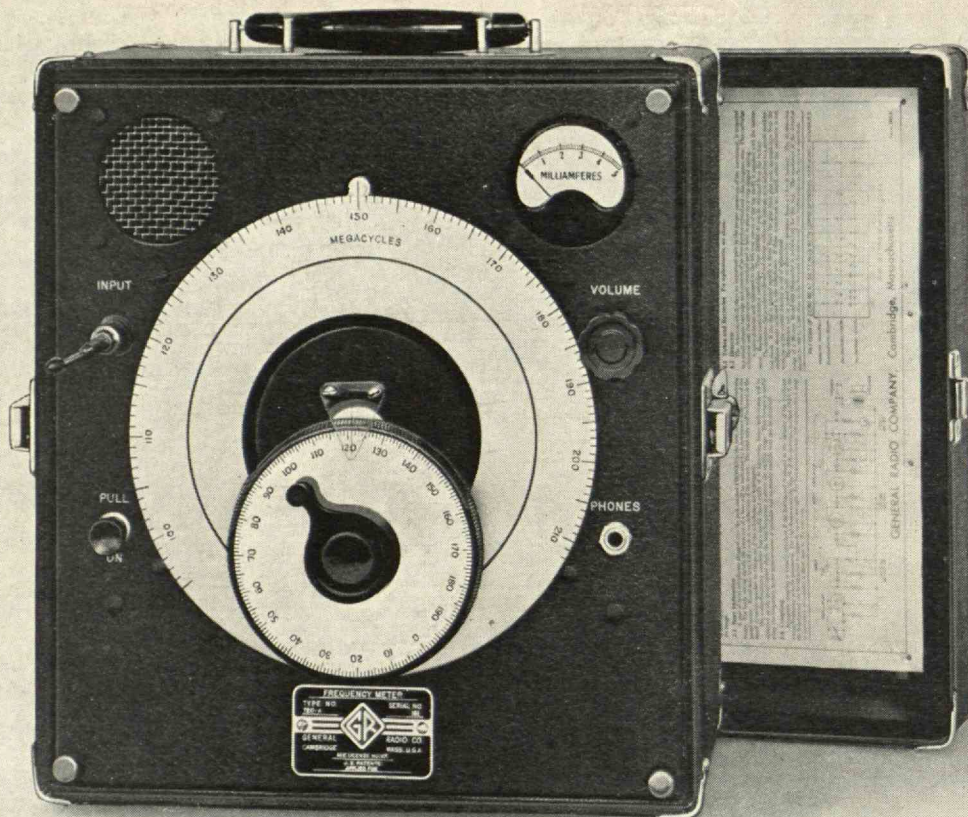


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